



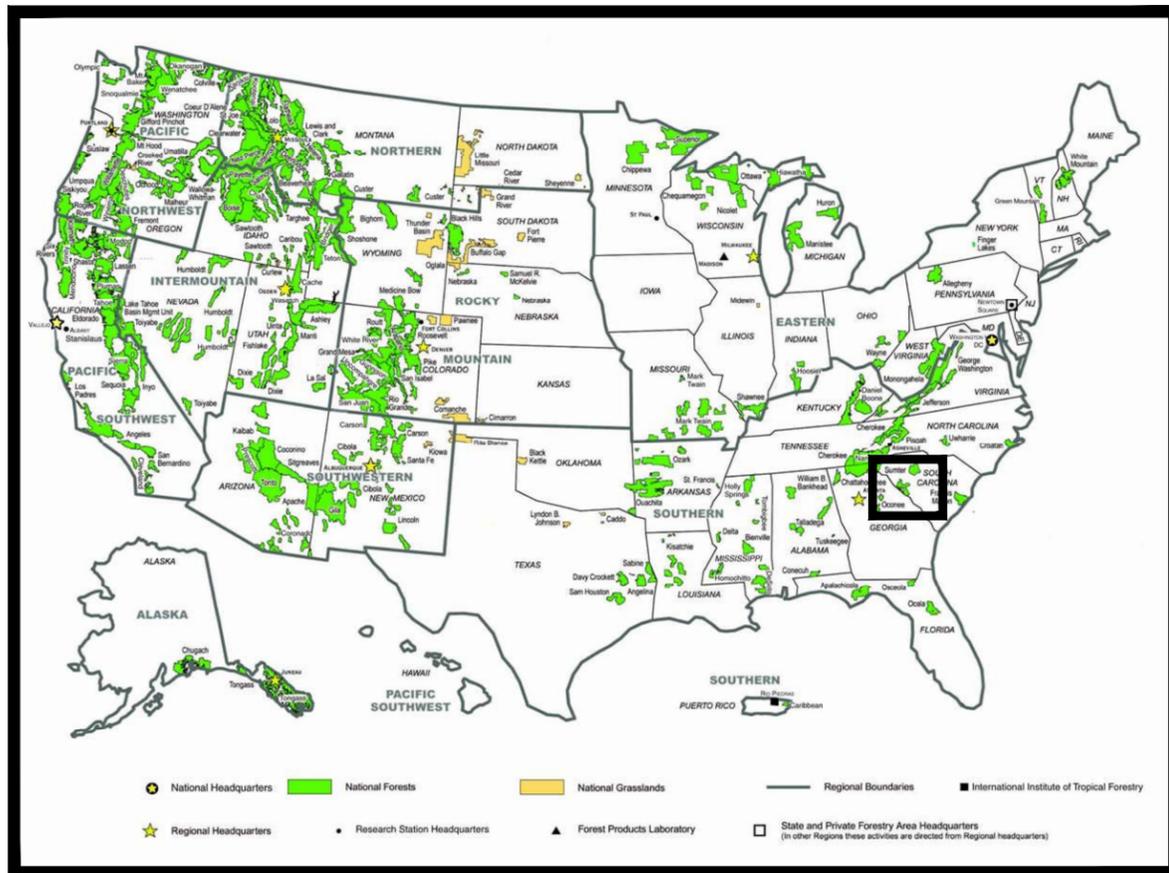
United States Department of Agriculture  
Forest Service

**(R8) SOUTHERN REGION  
FRANCIS MARION & SUMTER N.F.**

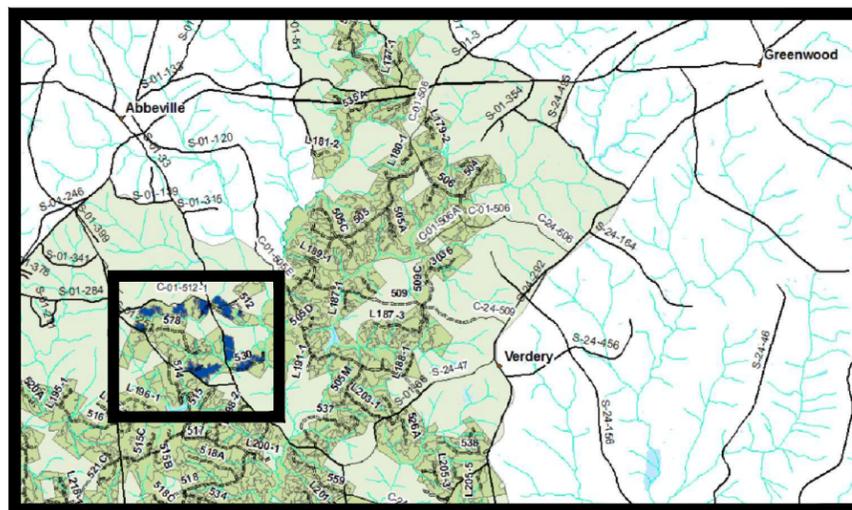
**MCCORMICK  
SOUTH CAROLINA**

**LONG CANE RANGER DISTRICT  
LC 192-193-194 Saw Timber Sale**

INDEX OF SHEETS		
SHEET	SHEET TITLE	DATE
G-01	COVER SHEET	
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C-09	Culvert Trench Details	
C-10	Culvert Backfill Details	



**PROJECT LOCATION**



**VICINITY MAP**

**TRAVEL DIRECTIONS:**

From the intersection of SC 72 and S-01-33, Cedar Springs Road, proceed south on Cedar Springs Road for 3.7 miles to the intersection with Jackson & Morris Road. This will place you at the Northeastern corner of the sale area.

From McCormick SC, Proceed 18.2 miles north on SC 28 to the intersection with Parson's Mountain Road, FSR 515. Proceed 0.7 miles Southeasterly on Parson's Mountain Road to the intersection with FSR 578 on the left.

**RECOMMENDED BY:**

FOREST ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

DISTRICT RANGER \_\_\_\_\_ DATE \_\_\_\_\_

ENGINEERING & REC STAFF OFFICER \_\_\_\_\_ DATE \_\_\_\_\_

FOREST SUPERVISOR \_\_\_\_\_ DATE \_\_\_\_\_

# LC 220 ST TIMBER SALE

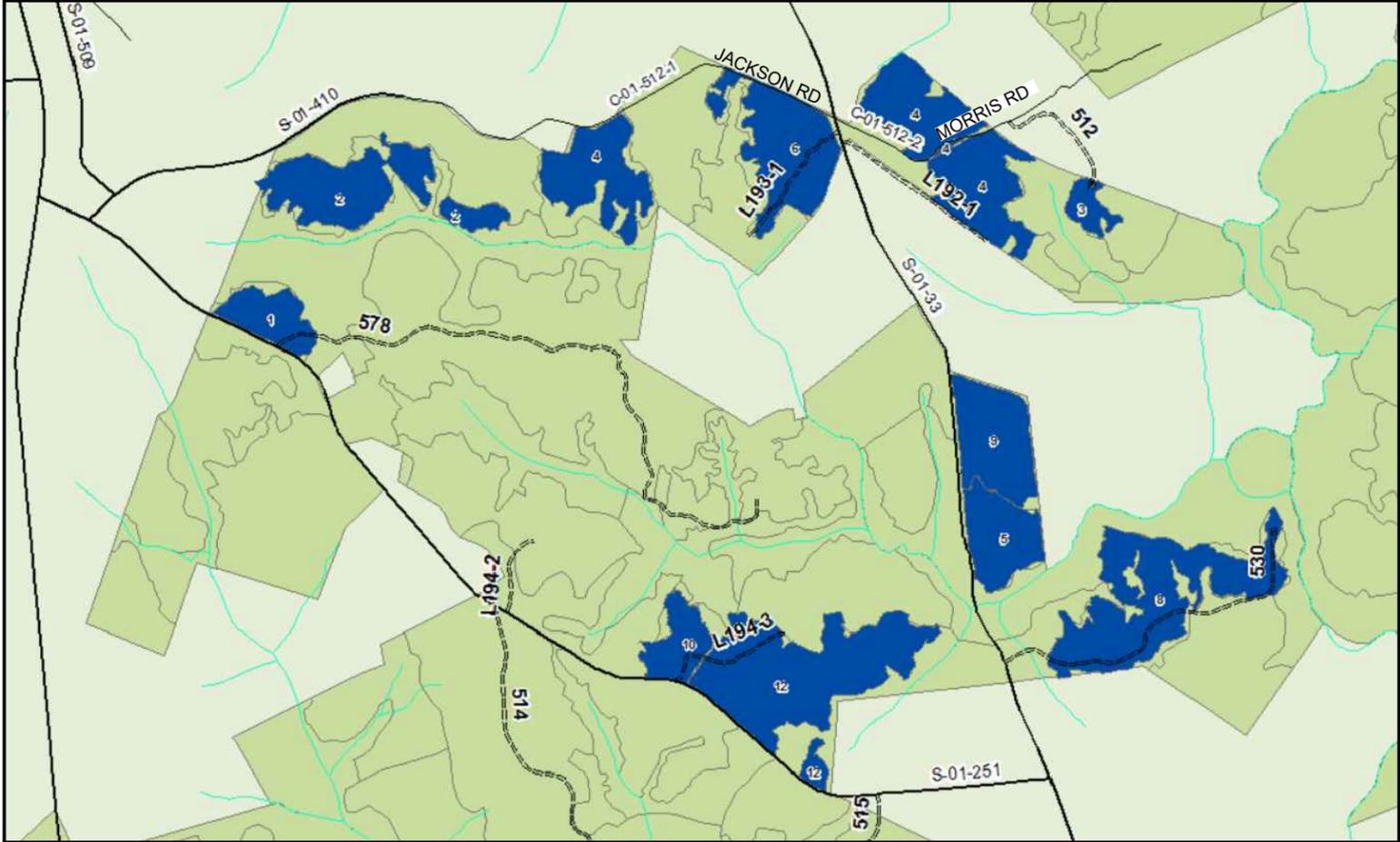


United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

## General Notes

- 20101: This item is all inclusive of clearing and grubbing according to FP-14 specifications. Work entails removal of trees & shrubs, heavy brushing, clearing debris such as tree fall, and grubbing vegetation & rootwads from the roadbed.
- 20104A: This item is intended for use where the Purchaser shall be required to complete heavy brushing and remove any potential windfall or debris from specified roads. Additionally the Purchaser is required to removed debris caused by brushing from the within the established clearing limits.
- 21201: The linear grading line item is intended for reconstruction of the roadbed, to include turn-arounds, after grubbing is completed. The finished product shall be a finished grade suitable for placement of aggregate.
- 25102: Class 1 riprap shall be placed and reinforced with mortar. Mortar shall completely seal any voids around culverts and bind the rip rap and culverts together. Construct according to FP-14 Section 616.06. Mortar shall conform to FP-14 Section 712.02. All mortar spillage shall be removed from National Forest lands.
- 30104: All aggregate on this project is to be placed loose and spread uniformly. Aggregate is to be compacted with hauling equipment over the entire width of the roadway.
- 30305A: Roadway reconditioning is intended to correct any irregularities in the roadway, road shoulders, & ditchline. This includes but is not limited to rutting, potholes, scour, and retained sediment. Where no irregularities exist, the Purchaser shall not be required to perform work.
- 60201: Culvert installation items shall include all items to provide a turn key culvert installation. This includes but is not limited to: culverts, excavation & backfill, and end sections as identified in the work list and schedule of items.



**PROJECT NAME**  
LC 192-193-194  
Saw Timber Sale  
  
Francis Marion &  
Sumter N.F.  
  
LONG CANE RANGER  
DISTRICT

**DRAWING TITLE**  
General Notes &  
Sale Area

**DATE**  
1/123/2020

**ARCHIVE NO.**

**DESIGNER**  
J. MORAN

**DWG SHEET NO.**  
G-02

**DRAWN**  
J. MORAN

**CHECKED**  
L. MUNDO

**PROJECT NO.**  
TBD

SHEET 2 OF 14

1/27/20 09:00 JIMORAN02 C:\USERS\JIMORAN02\BOX\7000ENGINEERING\7700TRAVEL\GMT\-----TIMBER PACKAGES\FY 2020\LC 192-193-194\DRAWING\192-193-194.DWG

SPECIFICATION AND SPECIAL PROJECT SPECIFICATION LIST						
Sale Name	LC 192-193-194 ST					
Road Number	530	512	L193-1	578	L194-3	
Road Name	Ford	Bethel		Easter		
Termi Miles (From)	0	0	0	0	0	
Termi Miles (To)	0.875	0.335	0.3	1.7	0.3	
C or R	R	R	R	R	R	
Traffic Service Level	I	I	J	J	J	
Maintenance Level	3	3	1	1	1	
Standard Specification For Construction of Roads and Bridges on Federal Highway Project						
FP-14	Standard for all roads					
Quarry Location	Greenwood, SC					
Standard Spec or	Latest Revision Date	Specifications that are referenced by other "X" denotes applicable standard specs. or special				
Standard Spec	2014					
101 - 150	"-----"	Apply	To	All	Contracts	
201		X		X	X	X
204		X				
212				X		X
251		X				
301		X	X	X	X	X
303		X	X		X	X
602				X		
619				X	X	X
625		X		X	X	X
633				X		X

F530 Work List	
Milepost	Work Description
0.00 - 0.875	Recondition the road prism. Spot place 500 Tons CR-14 Aggregate. Roadside heavy brushing.
0.06	Existing 36" CMP. Water running under culvert & scour pool at the outlet. Armor inlet with grouted class 1 rip rap. Ensure riprap and grout seal all areas around and under the culvert. Fill in the scour pool with class 1 rip rap. Armor exposed portion of pipe outlet with remaining class 1 rip rap. Approx 12 tons total at this mile post.
0.21 - 0.26	Reconstruct ditch on the right.
0.50	Existing 18" CMP. Scour pool at outlet. Fill in pool with class 1 rip rap and armor inlet & outlet. Approximately 8 tons.
0.88	Existing turn around. Place 20 tons of 3" surge stone and fill in depression holding water in driving lane. Resurface turn around with 60 tons CR-14.
F512 Work List	
Milepost	Work Description
0.00 - 0.33	Recondition the road prism. Spot place 80 tons CR-14.
L193-1 Work List	
Milepost	Work Description
0.00	Road begins on Jackson road at the powerline right of way
0.00 - 0.018	From 152 linear feet from the intersection of Jackson Road and County Road 33, Construct a new Forest Service Entrance with gate and a 15" x 44' RCP culvert perpendicular to Jackson Road. Approx 40 tons 3" surge stone.
0.018 - 0.06	Clear & grub 18' wide. Linear grading. Construct new road segment to connect to original road as staked by the Forest Service. Approx 50 tons 3" surge stone.
0.06 - 0.34	Minor clearing. Heavy Brushing, Spot place 110 tons 3" surge stone.
FSR 578 Work List	
Milepost	Work Description
0.00 - 0.03	Recondition roadway prism. 20 tons 3" minus surge stone, spot placment.
0.02	Existing gate. Replace missing barricade marker on gate and retroreflective object marker on hinge post.
0.03	Construct perpendicular turn-around. 20 Tons 3" Surge
L194-3 Work List	
Milepost	Work Description
0.00 - 0.018	Construct new Forest Service entrance with gate system. Clear & Grub extents, linear grading. Approx 40 tons 3" surge stone. Leave existing culvert in place. Install stop sign.
0.018 - 0.30	Recondition road prism. Heavy brushing. Spot place 80 tons 3" minus aggregate.



United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

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**PROJECT NAME**

LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

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**DRAWING TITLE**

Specification List,  
Road Data, & Work  
List

---

**DATE**  
01/24/2020

**ARCHIVE NO.**

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<b>DESIGNER</b> J. MORAN	<b>DWG SHEET NO.</b> <b>G-03</b>
<b>DRAWN</b> J. MORAN	
<b>CHECKED</b> L. MUNDO	
<b>PROJECT NO.</b> TBD	<b>SHEET 03 OF 14</b>

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United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

**ESTIMATE OF QUANTITIES (LC192-193-194 Saw Timber Sale)**

SHEET 1 OF 1

ROAD NUMBER	530	512	L193-1	578	L194-3			Sum
DISTANCE (MILES)	0.88	0.34	0.30	0.03	0.30			Total

ITEM NO.	DESCRIPTION	METHOD OF MEASURE	UNIT	REV. DATE	QUANTITIES					REMARKS
15101	Mobilization	CQ	EA	2014	1.00	1.00	1.00	1.00	1.00	
20101	Clearing and Grubbing, Disposal Method "F"	CQ	Acre	2014			0.14	0.03	0.14	Removal of all trees & vegetation prior to linear grading work
20104A	Heavy Brushing & Clearing	CQ	Mile	2014	0.88		0.28		0.28	
20412	Ditch Construction	CQ	LF	2014	264.00					264.00
21201	Linear Grading	CQ	Mile	2014			0.34		0.02	Includes all work to re-construct road prisms and composite turn arounds.
25102	Grouted Class 1 Riprap	CQ	Ton	2014	20.00					20.00
30104A	Aggregate Placement Grading CR14, Compaction C	CQ	Ton	2014	560.00	80.00				640.00
30104B	Aggregate Placement Grading 3" Surge stone	CQ	Ton	2014	20.00		200.00	40.00	120.00	380.00
30305A	Roadway Reconditioning, Compaction Method C	CQ	Mile	2014	0.88	0.33		0.03	0.28	0.64
60201A	<15"> inch Class 3 RCP with gaskets (Complete)	CQ	LF	2014			44.00			44.00
61901A	Install Farm Gate	CQ	EA	2014			1.00		1.00	2.00
61901B	Replace missing gate signs	CQ	LS	2014				1.00		
62502	Turf Establishment	CQ	Acre	2014	0.10		0.50	0.50	0.25	1.35
63301	Install Stop Sign & wood post	CQ	EA	2014			1.00		1.00	2.00

**PROJECT NAME**

LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

**DRAWING TITLE**

Estimate of  
Quantities

**DATE**

01/24/2019

**ARCHIVE NO.**

**DESIGNER**

J. MORAN

**DRAWN**

J. MORAN

**CHECKED**

L. MUNDO

**PROJECT NO.**

TBD

**DWG SHEET NO.**

**G-04**

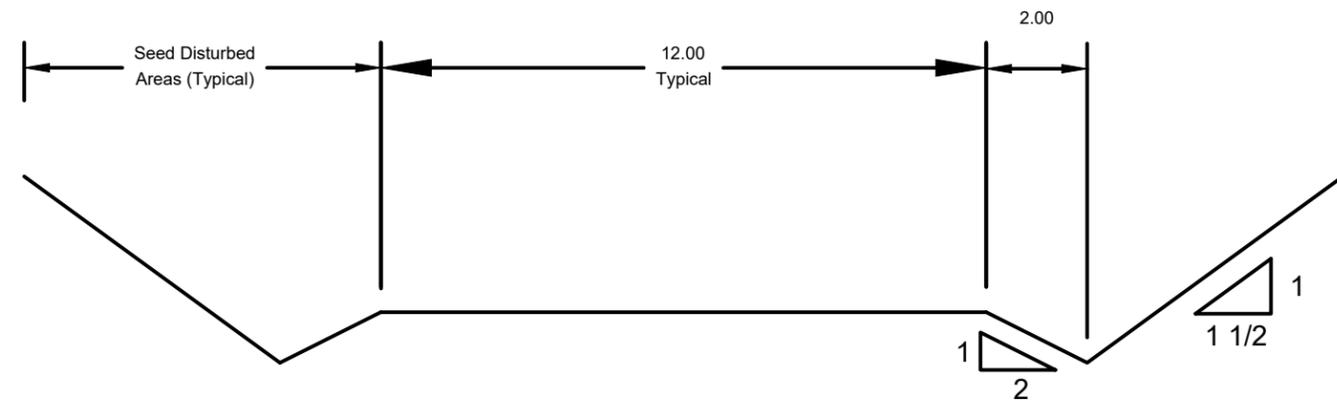
SHEET 4 OF 14

# TYPICAL ROAD CROSS SECTIONS

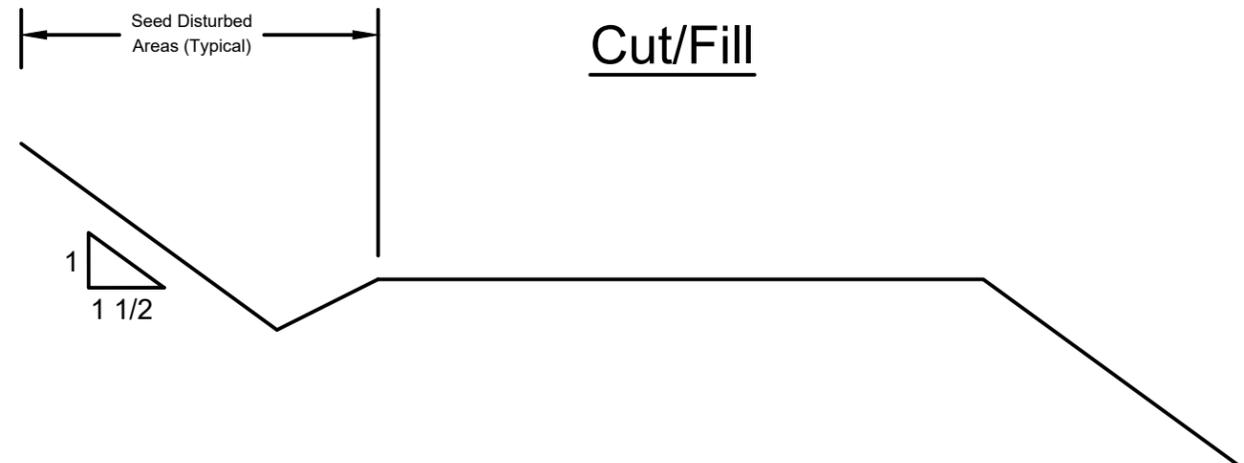
Project Maintenance Level 2 Roads

Not to Scale

## Through Cut



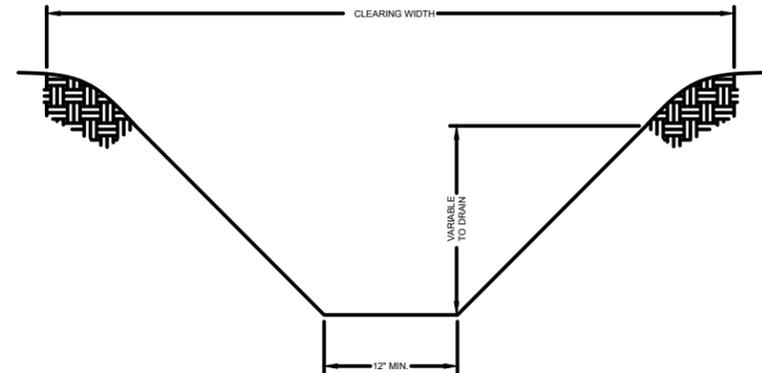
## Cut/Fill



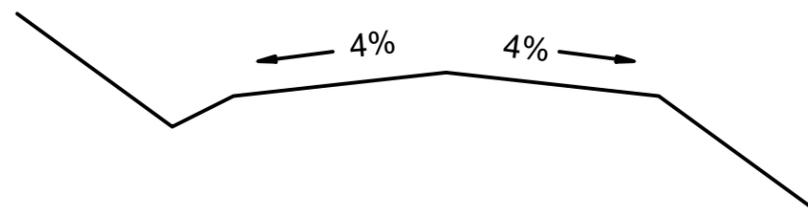
## Fill



## Typical Lead-Off Ditch



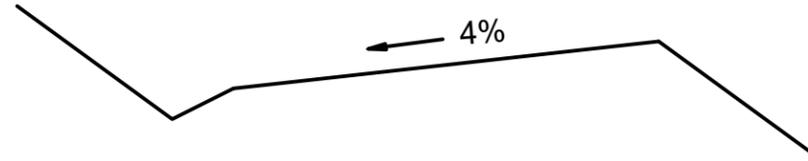
### CROWN



### OUTSLOPE



### INSLOPE



United States Department of Agriculture  
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**PROJECT NAME**  
LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

**DRAWING TITLE**  
Typical Cross  
Sections

**DATE**  
12/11/2019

**ARCHIVE NO.**

**DESIGNER**  
J. MORAN

**DRAWN**  
J. MORAN

**CHECKED**  
L. MUNDO

**PROJECT NO.**  
TBD

**DWG SHEET NO.**  
C-01

SHEET 5 OF 14

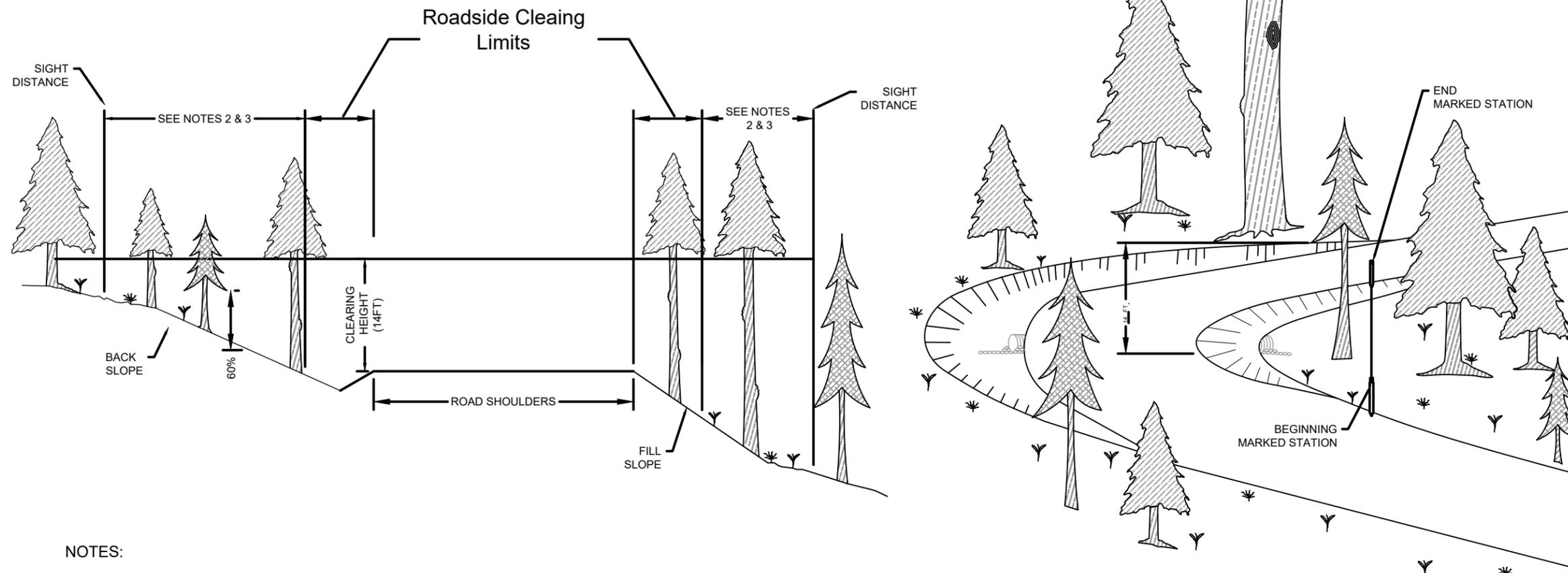
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# Clearing Limit Details

Not to Scale



**NOTES:**

1. ALL CONIFERS, HARDWOODS AND BRUSH WITHIN 6 FEET OF THE SHOULDERS OF FOREST ROADS OR THE BOTTOM OF THE DITCH SHALL BE REMOVED.
2. ALL CONIFERS, HARDWOODS AND BRUSH WITHIN 2 FEET OF THE SHOULDERS OF MAINTENANCE LEVEL II ROADS OR THE BOTTOM OF THE DITCH SHALL BE REMOVED.
2. THE AREA OF SIGHT DISTANCE CLEARING WILL BE FROM THE ROADSIDE CLEARING LIMIT. TO A LINE OF SIGHT BETWEEN THE BEGINNING AND ENDING STATIONS MARKED ON THE GROUND. CONIFERS WITHIN THIS AREA SHALL BE THINNED TO APPROXIMATELY A 2 FOOT TRUNK SPACING, EXCEPT WHERE MARKED WITH PAINT OR FLAGGING FOR REMOVAL TO AN ALTERNATE SPACING. ALL HARDWOODS AND BRUSH WITHIN THERE LIMITS SHALL BE REMOVED.
3. BRANCHES ON REMAINING CONIFERS SHALL BE TRIMMED FROM GROUND LEVEL TO A CLEARING HEIGHT LIMIT 14 FEET ABOVE THE ROADBED OR TO A LIMIT OF 60% OF THE TREE'S HEIGHT, WHICHEVER IS LESS. LIMBS OF VEGETATION SHALL BE CUT SO AS NOT TO PROTRUDE WITHIN THE CLEARING (ROADSIDE AND HEIGHT) LIMITS.



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LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

**DRAWING TITLE**

Clearing Limits

**DATE**

01/24/2020

**ARCHIVE NO.**

**DESIGNER**

J. MORAN

**DRAWN**

J. MORAN

**CHECKED**

L. MUNDO

**PROJECT NO.**

TBD

**DWG SHEET NO.**

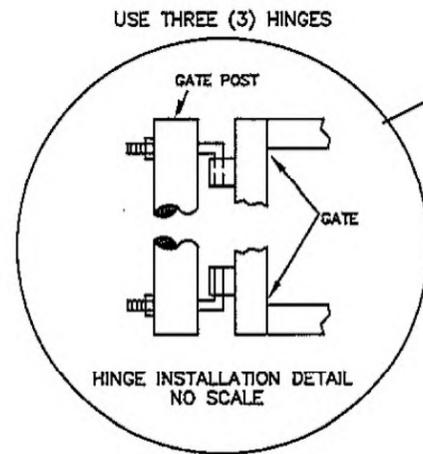
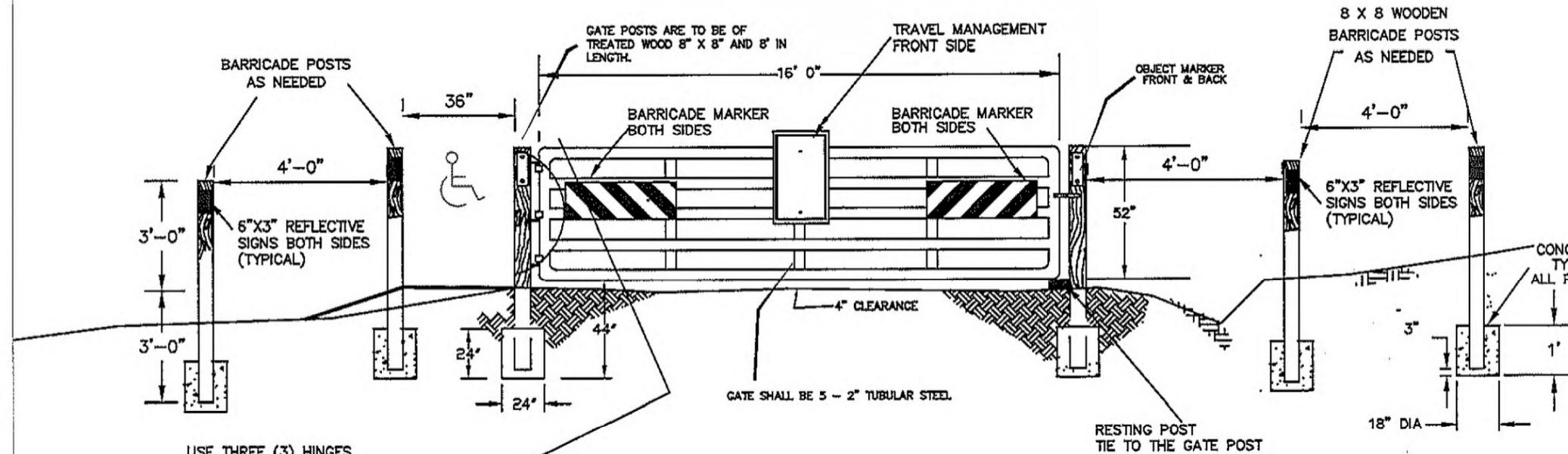
**C-04**

SHEET 8 OF 14

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# FARM GATE DETAIL



### ACCESSIBILITY NOTES:

1. ACCESSIBLE ACCESS CAN BE PROVIDED ON EITHER SIDE OF THE GATE, WHERE GROUND CONDITION AND SHAPE FIT BETTER.
2. DO NOT BLOCK ROAD DITCH, RELOCATION MAY BE NEEDED
3. ACCESS SHALL BE 36" WIDE AT ROAD HEIGHT, BYPASSING SHALL MATCH ROAD SURFACE WITHOUT ANY OBSTACLES.
4. HINGE BOLTS SHALL BE FREE OF ANY SHARP EDGES, ON THE ACCESSIBILITY ACCESS SIDE.

### NOTES:

1. WOODEN POSTS SHALL BE TREATED WITH 0.40 OF ACQ - OR CHROMATE COPPER ARSENATE (CCA), MINIMUM RETENTION 0.40 POUNDS PER CUBIC FOOT
2. GATE SHALL BE 16 GAUGE STEEL FARM TYPE, 2" TUBULAR 52" HIGH X 16' WIDE. ALL FARM GATES SHALL HAVE STANDARD RED COLOR FOR PAINT.
3. CONTRACTOR SHALL FURNISH AND INSTALL 3 GATE HINGES AND PROVIDE LOCKING CHAIN TO COR, 1/4" X 6' LONG, GALVANIZED AT EACH FARM GATE INSTALLATION.
4. ALL SIGNS, OBJECT MARKERS, AND HARDWARE SHALL BE FURNISHED AND INSTALL BY THE CONTRACTOR. FOREST SERVICE WILL APPLY STICKERS TO TRAVEL MANAGEMENT SIGN.

### 5. SIGN SUPPLIER INFORMATION:

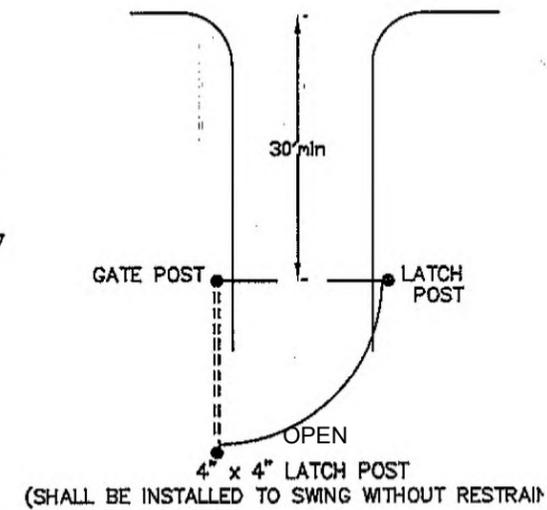
UNICOR; PHONE 1-805-735-6211, FAX 1-805-735-4507

BARRICADE MARKERS FOR GATES  
ALUMINUM, UNICOR PT#ALSP0025  
RED/WHITE, RIGHT, DIAMOND GRADE, 8X24

BARRICADE MARKERS FOR GATES  
ALUMINUM, UNICOR PT#ALSP0025  
RED/WHITE, LEFT, DIAMOND GRADE, 8X24

TRAVEL MANAGEMENT P7115  
ALUMINUM, UNICOR PT#ALSP0075  
12X18, HI-INTENSITY

OBJECT MARKER  
ALUMINUM, UNICOR PT#ALDC0025,  
YELLOW 3"X6", HI-INTENSITY



United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

### PROJECT NAME

LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

### DRAWING TITLE

Farm Gate Details

### DATE

01/24/2020

### ARCHIVE NO.

### DESIGNER

J. MORAN

### DRAWN

J. MORAN

### CHECKED

L. MUNDO

### PROJECT NO.

TBD

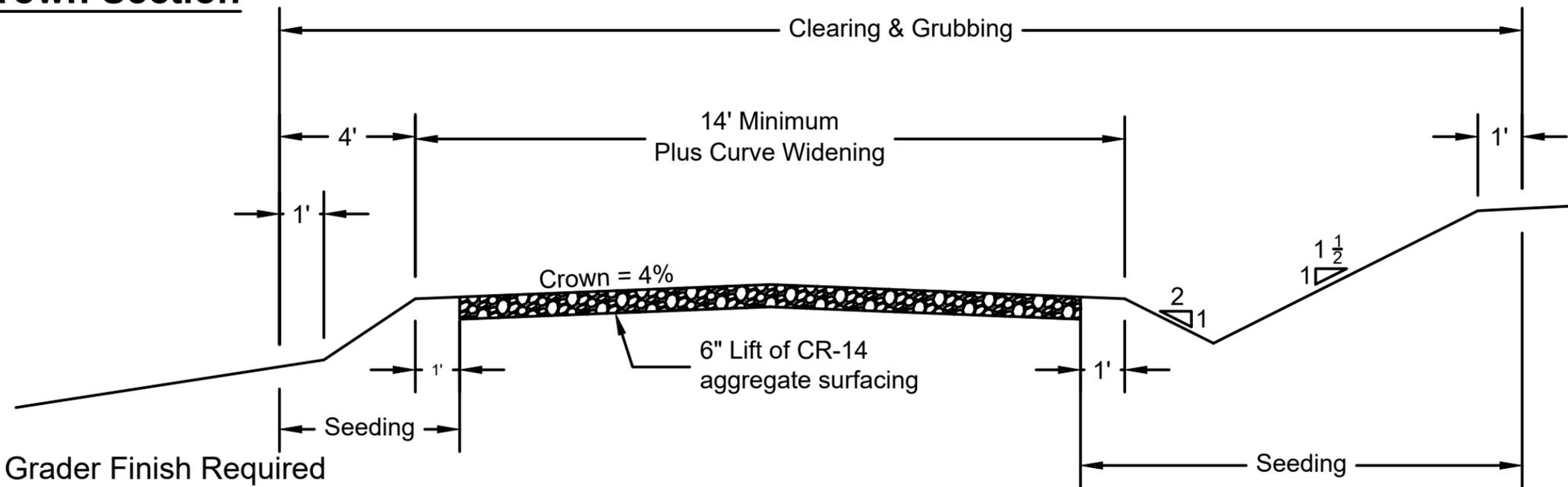
### DWG SHEET NO.

C-05

SHEET 9 OF 14

# Detailed Crown Section

Not to Scale



Note: Motor Grader Finish Required



United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

### PROJECT NAME

LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

### DRAWING TITLE

Cross Section  
& Turn Out Detail

### DATE

01/24/2020

### ARCHIVE NO.

### DESIGNER

J. MORAN

### DRAWN

J. MORAN

### CHECKED

L. MUNDO

### PROJECT NO.

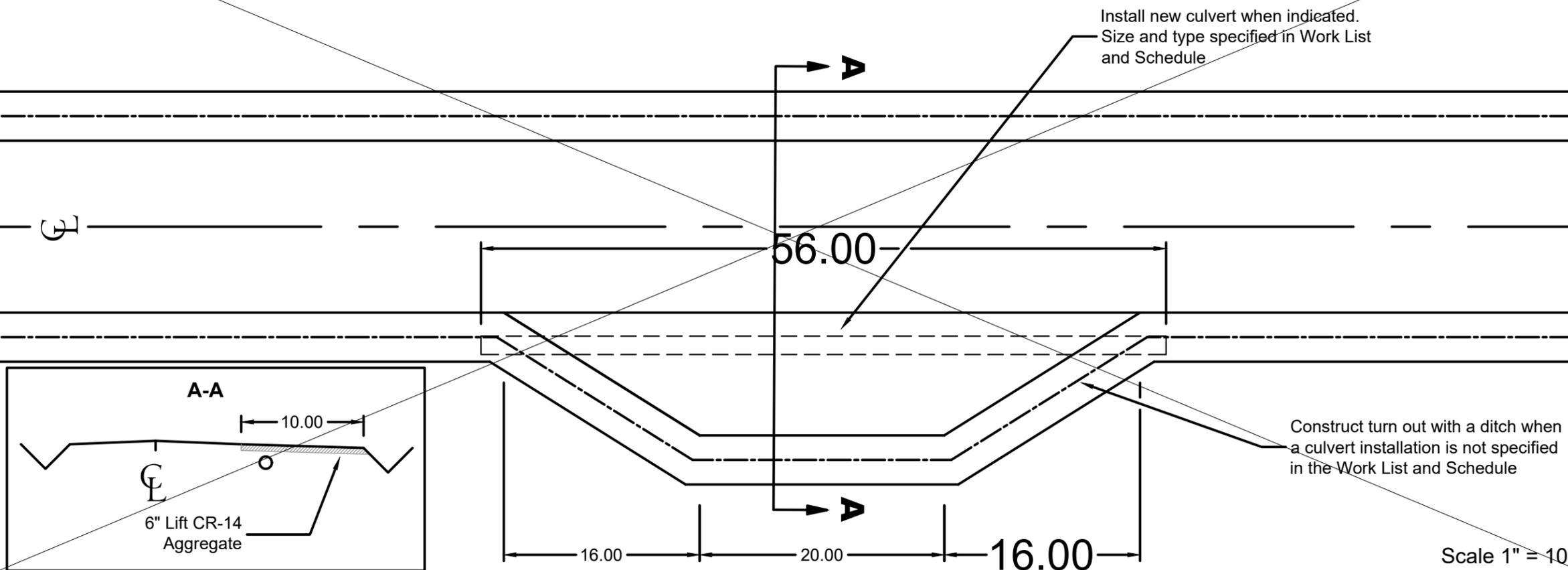
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### DWG SHEET NO.

C-06

SHEET 10 OF 14

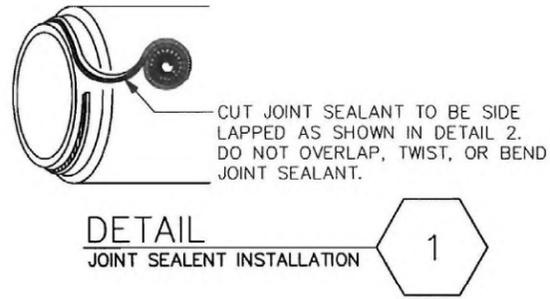
# Turn Out Typical



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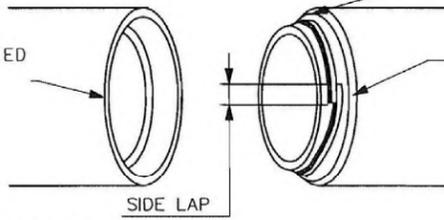


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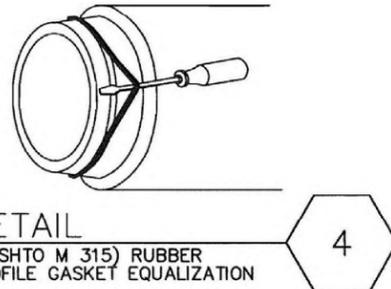
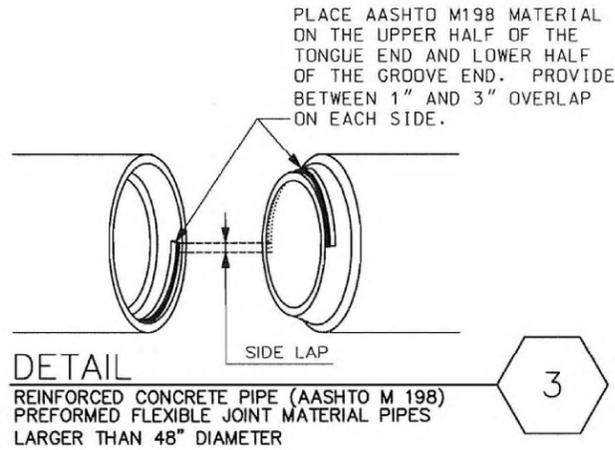
AASHTO M 198 PREFORMED FLEXIBLE JOINT SEALANT  
(INSTALL ACCORDING TO MANUFACTURER'S DIRECTIONS  
AND FP-14 SPECIFICATIONS)

PIPE MAY BE BELLED IF SUPPLIED BY MANUFACTURER



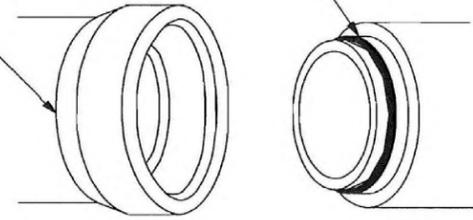
PROVIDE BETWEEN 1" & 3" SIDE LAP OF JOINT MATERIAL. DO NOT INSTALL WITH GAPS IN JOINT MATERIAL. DO NOT TWIST ENDS OF SEALANT AROUND EACH OTHER OR STACK ONE END ON TOP OF THE OTHER.

DETAIL  
REINFORCED CONCRETE PIPE (AASHTO M 198)  
PREFORMED FLEXIBLE JOINT MATERIAL PIPES  
UP TO AND INCLUDING 48" DIAMETER



AASHTO M 315 RUBBER GASKET  
(INSTALL ACCORDING TO MANUFACTURERS  
DIRECTIONS AND FP-14 SPECIFICATIONS)

PIPE MAY BE BELLED IF SUPPLIED BY MANUFACTURER

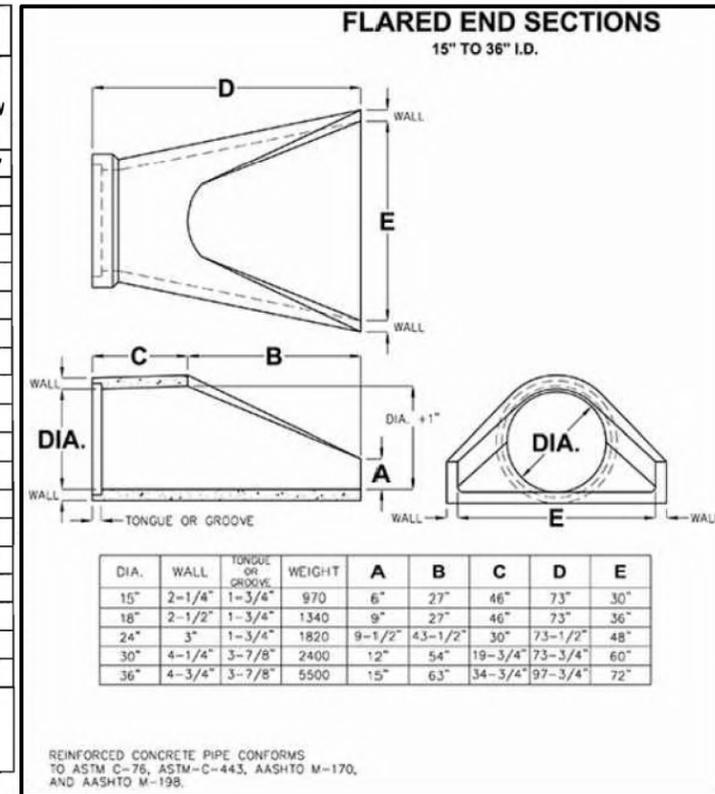


DETAIL  
(AASHTO M 315) RUBBER  
PROFILE GASKET

TABLE 714-205A: REINFORCED CONCRETE PIPE FILL HEIGHT TABLE

PIPE DIAMETER, [IN]	HYDRAULIC AREA, [FT <sup>2</sup> ]	MANNING'S ROUGHNESS COEFFICIENT, [n]	ESTIMATED MINIMUM TRENCH WIDTH, [IN]	CASE 1: MAXIMUM COVER HIGHWAY VEHICLE LOADING, [FT]			CASE 2: MINIMUM COVER HIGHWAY VEHICLE LOADING, [FT]			CASE 3: MINIMUM COVER FOR CONSTRUCTION VEHICLE [FT] (AASHTO 27.5.4.4)			CASE 4: UNIVERSAL DRIVEWAY MINIMUM COVER [FT] NOT FOR USE IN ROADWAY			CASE 6: MAXIMUM COVER WITH INVERT AT 2 X O.D. BELOW GROUNDWATER, [FT]		
				CLASS III	CLASS IV	CLASS V	CLASS III	CLASS IV	CLASS V	CLASS III	CLASS IV	CLASS V	CLASS III	CLASS IV	CLASS V	CLASS III	CLASS IV	CLASS V
12	0.78	SEE MFG	42	16	25	30	1.75	1.00+	1.00+	3	3	3	1.75	1.00	0.50	---	20	30
15	1.22	SEE MFG	45	16	25	30	1.50	1.00+	1.00+	3	3	3	1.50	1.00	0	13	21	30
18	1.76	0.012	49	16	25	30	1.50	1.00+	1.00+	3	3	3	1.50	0.75	0	13	21	30
24	3.14	0.012	60	16	25	30	1.00	1.00+	1.00+	3	3	3	1.00	0	0	13	21	30
30	4.90	0.012	70	16	25	30	1.00	1.00+	1.00+	3	3	3	1.00	0	0	13	21	30
36	7.06	0.012	81	16 (B)	25 (B)	30	1.00+ (B)	1.00+ (B)	1.00+	3 (B)	3 (B)	3	0 (B)	0 (B)	0	---	12 (B)	25
42	9.62	0.012	91	16 (B)	25 (B)	30	1.00+ (B)	1.00+ (B)	1.00+	3 (B)	3 (B)	3	0 (B)	0 (B)	0	---	14 (B)	27
48	12.56	0.012	102	16	25	30	1.00+	1.00+	1.00+	3	3	3	0	0	0	---	16	26
54	15.90	0.012	112	16	25	30	1.00+	1.00+	1.00+	3	3	3	0	0	0	10	17	26
60	19.63	0.012	123	15	25	30	1.00+	1.00+	1.00+	3	3	3	0	0	0	10	16	25
66	23.75	0.012	133	15	25	30	1.00+	1.00+	1.00+	3	3	3	0	0	0	12	15	25
72	28.27	0.012	144	15	24	30	1.00+	1.00+	1.00+	3	3	3	0	0	0	12	18	23
78	33.18	0.012	154	15	24	---	1.00+	1.00+	---	3	3	---	0	0	---	12	17	---
84	38.48	0.012	165	15	24	---	1.00+	1.00+	---	3	3	---	0	0	---	12	17	---
90	44.17	0.012	175	15	---	---	1.00+	---	---	3	---	---	0	---	---	13	---	---
96	56.74	0.012	186	14	---	---	1.00+	---	---	3	---	---	0	---	---	13	---	---
108	63.61	0.012	207	14	---	---	1.00+	---	---	3	---	---	0	---	---	13	---	---
120	78.54	0.012	228	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

(B) B WALL ONLY, C WALL IS NOT ALLOWED FOR THIS DIAMETER AND CLASS.  
 "----" TYPICALLY INDICATE THAT PIPE SIZE IS NOT AVAILABLE OR IS NOT RECOMMENDED FOR THIS CONDITION.  
 "++" INDICATE THAT MINIMUM COVER MAY BE REDUCED TO 0.75' FOR SPECIFIED CLASS WHEN PIPE IS INSTALLED UNDER RIGID PAVEMENT.



DIA.	WALL	TONGUE OR GROOVE	WEIGHT	A	B	C	D	E
15"	2-1/4"	1-3/4"	970	6"	27"	46"	73"	30"
18"	2-1/2"	1-3/4"	1340	9"	27"	46"	73"	36"
24"	3"	1-3/4"	1820	9-1/2"	43-1/2"	30"	73-1/2"	48"
30"	4-1/4"	3-7/8"	2400	12"	54"	19-3/4"	73-3/4"	60"
36"	4-3/4"	3-7/8"	5500	15"	63"	34-3/4"	97-3/4"	72"

REINFORCED CONCRETE PIPE CONFORMS TO ASTM C-76, ASTM-C-443, AASHTO M-170, AND AASHTO M-198.



United States Department of Agriculture  
Forest Service

(R08)  
Southern Region

PROJECT NAME  
LC 192-193-194  
Saw Timber Sale

Francis Marion &  
Sumter N.F.

LONG CANE RANGER  
DISTRICT

DRAWING TITLE  
RCP Pipe Details

DATE  
01/24/2020

ARCHIVE NO.

DESIGNER  
J. MORAN

DWG SHEET NO.

C-08

DRAWN  
J. MORAN

CHECKED  
L. MUNDO

PROJECT NO.  
TBD

SHEET 12 OF 14

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United States Department of Agriculture  
Forest Service

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DISTRICT

**DRAWING TITLE**

Culvert Trench  
Details

**DATE**

01/24/2020

**ARCHIVE NO.**

**DESIGNER**

J. MORAN

**DRAWN**

J. MORAN

**CHECKED**

L. MUNDO

**PROJECT NO.**

TBD

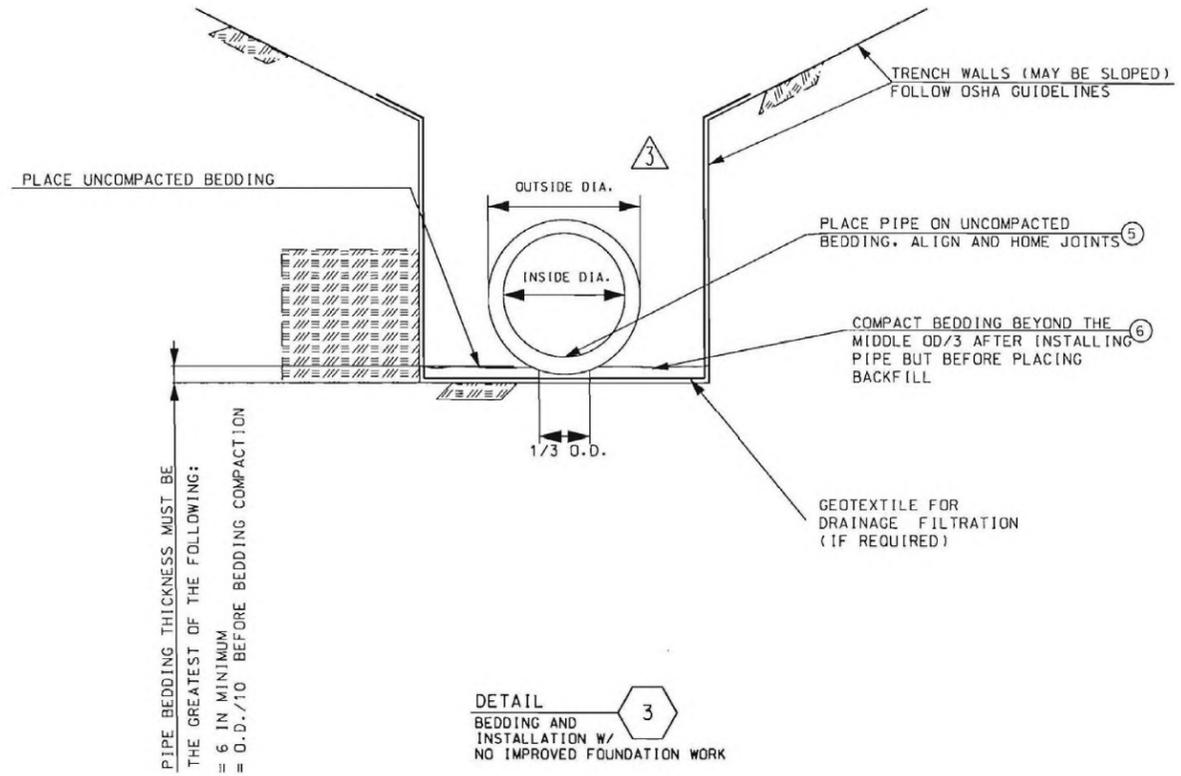
**DWG SHEET NO.**

C-09

**SHEET 13 OF 14**

① ALL PIPE REQUIRE GOOD FOUNDATION MATERIAL. WHEN SITE SOILS REQUIRE THE INSTALLATION OF AN IMPROVED PIPE FOUNDATION, REFER TO THE FP-14 SPECIFICATIONS.

DETAIL FOUNDATION REQUIREMENTS 1



DETAIL BEDDING AND INSTALLATION W/ NO IMPROVED FOUNDATION WORK 3

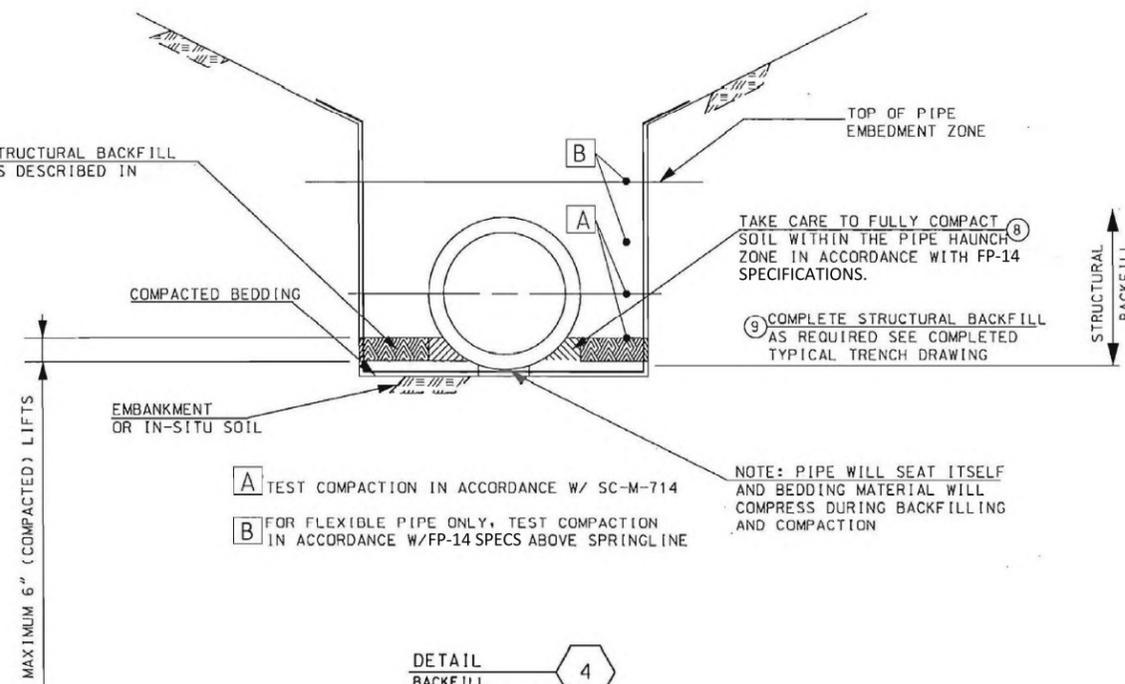
② CONSTRUCT EMBANKMENT AS REQUIRED BEFORE EXCAVATION OF PIPE TRENCH. EMBANKMENT BACKFILL MUST BE ABLE TO SUPPORT PIPE STRUCTURAL BACKFILL.

ADJACENT EMBANKMENT MATERIAL MUST BE COMPACTION WITHIN 5% OF COMPACTION LEVEL OF STRUCTURAL BACKFILL

TRENCH WIDTH  
EXCAVATE TRENCH (WALLS MAY BE SLOPED) FOLLOW OSHA GUIDELINES 3  
THE GREATEST OF  
1.5 x O.D. + 12"  
1.0 x O.D. + 24"  
- OR - AS REQUIRED TO SAFELY FIT PERSONNEL AND COMPACTION EQUIPMENT

DETAIL TRENCH PREPARATION W/ NO IMPROVED FOUNDATION WORK 2

⑦ PLACE STRUCTURAL BACKFILL LIFTS AS DESCRIBED IN

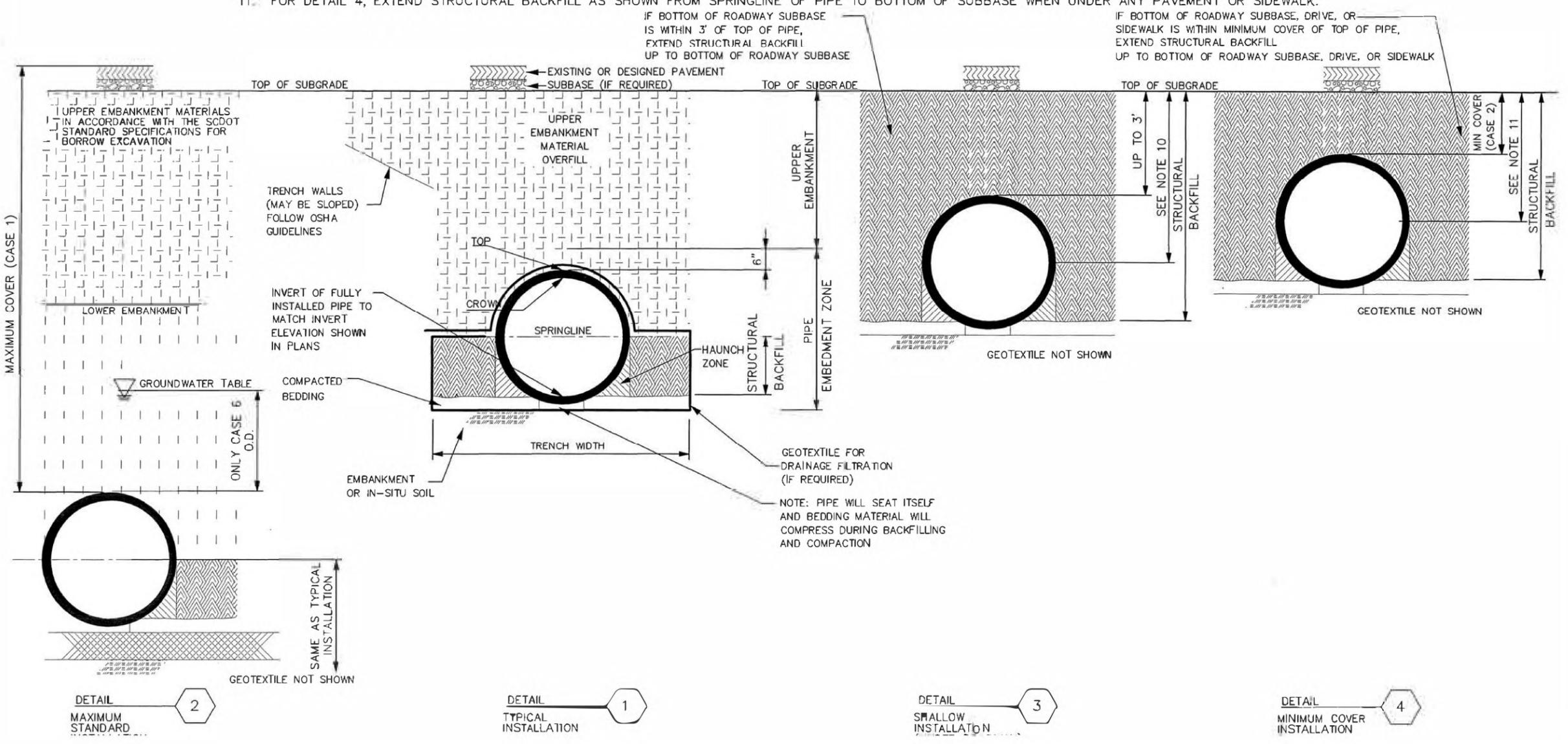


DETAIL BACKFILL INSTALLATION W/ NO IMPROVED FOUNDATION WORK 4

NOTE: PIPE WILL SEAT ITSELF AND BEDDING MATERIAL WILL COMPRESS DURING BACKFILLING AND COMPACTION

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- NOTES:
1. USE MATERIALS AND METHODS OF CONSTRUCTION FOR PERMANENT PIPE IN CONFORMANCE WITH FP-14 SPECIFICATIONS
  2. SEE SHEET FOR RCP FILL HEIGHT TABLES.
  3. WHEN CONNECTING DISSIMILAR PIPE, USE DRAINAGE STRUCTURE OR DESIGN INTERFACE. DO NOT MIX PIPE TYPE, CLASS, OR DETAILS WITHIN A SINGLE RUN OF PIPE BETWEEN DRAINAGE STRUCTURES.
  4. USE AT LEAST THE MINIMUM CLASS OR GAGE REQUIRED TO CARRY THE FILL HEIGHT AS SPECIFIED IN THE STANDARD DRAWING FILL HEIGHT TABLES. WHEN PIPE CLASS IS SPECIFIED IN THE PLANS, CONFIRM THAT THE SPECIFIED CLASS CAN CARRY THE INSTALLED MAXIMUM COVER BEFORE BACKFILLING THE PIPE. IF INSTALLED GRADES VARY FROM THOSE SHOWN IN THE PLANS, CONFIRM THAT PIPE CLASS IS SUFFICIENT TO CARRY THE INSTALLED FILL HEIGHTS. DO NOT REDUCE THE PIPE CLASS BELOW THE CLASS SHOWN IN THE PLANS UNLESS DIRECTED BY THE ENGINEER.
  5. USE RIPRAP, BEVELED ENDS, REINFORCED CONCRETE SLAB, WINGWALLS, OR END TREATMENT AS DESCRIBED IN THE PLANS.
  6. PIPE EMBEDMENT ZONE BACKFILL MUST MEET OR EXCEED THE MINIMUM MATERIAL AND COMPACTION REQUIREMENTS OF THE ROADWAY EMBANKMENT FOR THE SPECIFIED BURIAL DEPTH WITHOUT DAMAGING THE PIPE.
  7. FOR SHALLOW INSTALLATIONS (PAVEMENT ON MINIMUM COVER), INSTALL PIPE EMBEDMENT ZONE MATERIAL TO PREVENT SETTLEMENT AROUND THE PIPE. IF REQUIRED, USE STRUCTURAL BACKFILL MATERIAL OR CLSM TO PREVENT THIS SETTLEMENT.
  8. USE THIS INSTALLATION ONLY IN LOCATIONS ABOVE GROUNDWATER TABLE. USE THIS INSTALLATION IN LOCATIONS WHERE PIPE SYSTEM IS NOT SUBJECTED TO PRESSURE HEAD.
  9. FOR DETAILS 1 & 2, INSTALL STRUCTURAL BACKFILL AS SHOWN, AND USE BORROW EXCAVATION REQUIREMENTS FOR SOIL ABOVE PIPE EMBEDMENT ZONE.
  10. FOR DETAIL 3, EXTEND STRUCTURAL BACKFILL AS SHOWN FROM SPRINGLINE OF PIPE TO BOTTOM OF SUBBASE WHEN UNDER ROADWAY PAVEMENT (INCLUDING PAVED SHOULDERS). USE DETAIL 2 INSTALLATION WHEN NOT UNDER ROADWAY PAVEMENT.
  11. FOR DETAIL 4, EXTEND STRUCTURAL BACKFILL AS SHOWN FROM SPRINGLINE OF PIPE TO BOTTOM OF SUBBASE WHEN UNDER ANY PAVEMENT OR SIDEWALK.



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J. MORAN

DWG SHEET NO.  
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L. MUNDO

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TBD

SHEET 14 OF 14

# LC 192-193-194 Saw Timber Sale

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# Preface

Preface\_wo\_01\_27\_2020

**Delete all but the first paragraph and add the following:**

The Forest Service, US Department of Agriculture has adopted FP-14 for construction of National Forest System Roads.

# 101 - Terms, Format, and Definitions

101.01\_National\_11\_9\_2016

## **Add the following paragraph to Subsection 101.01:**

### 101.01 Meaning of Terms.

Delete all references to the TAR (Transportation Acquisition Regulations) in the specifications.

101.03\_National\_11\_9\_2016

## **Add the following to Subsection 101.03:**

### 101.03 Abbreviations.

#### **(a) Acronyms.**

AGAR — Agriculture Acquisition Regulations  
AFPA — American Forest and Paper Association  
FSAR — Forest Service Acquisition Regulations  
MSHA — Mine Safety and Health Administration  
NESC — National Electrical Safety Code  
WCLIB — West Coast Lumber Inspection Bureau

#### **(f) Miscellaneous unit abbreviations.**

MP	—	milepost	location
ppm	—	parts per million	volume
STA		station	location

101.04\_National\_1\_22\_2020

## **Make the following changes to Subsection 101.04:**

### 101.04 Definitions.

#### **Delete these definitions and replace the following:**

**Bid Schedule** — The Schedule of Items.

**Bridge** — A structure, including supports, erected over a depression or an obstruction such as water along a road, a trail, or a railway and having a deck for carrying traffic or other loads.

**Contractor** — The individual or legal entity contracting with the Government for performance of prescribed work. In a timber sale contract, the contractor is the “Purchaser”.

**Culvert** — Any structure with a bottom, regardless of fill depth, depth of invert burial, or presence of horizontal driving surface, or any bottomless (natural channel) structure with footings that will not have wheel loads in direct contact with the top of the structure.

**Drawings** — (Public Works Contracts) Design sheets or fabrication, erection, or construction details submitted to the CO by the Contractor according to FAR Clause 52.236-21 Specifications and Drawings for Construction. Also refers to submissions and submittals.

**Notice to Proceed** — (Public Works Contracts) Written notice to the Contractor to begin the contract work.

**Right-of-Way** — A general term denoting (1) the privilege to pass over land in some particular line (including easement, lease, permit, or license to occupy, use, or traverse public or private lands), or (2) Real property necessary for the project, including roadway, buffer areas, access, and drainage areas.

**Solicitation**—(Public Works Contracts) The complete assembly of documents (whether attached or incorporated by reference) furnished to prospective bidders.

**Add the following definitions:**

**Adjustment in Contract Price** — “Equitable adjustment,” as used in the Federal Acquisition Regulations, or “construction cost adjustment,” as used in the Timber Sale Contract, as applicable.

**Change** — “Change” means “change order” as used in the Federal Acquisition Regulations, or “design change” as used in the Timber Sale Contract.

**Forest Service** — The United States of America, acting through the Forest Service, U.S. Department of Agriculture.

**Neat Line** — A line defining the proposed or specified limits of an excavation or structure.

**Pioneer Road** — Temporary construction access built along the route of the project.

**Purchaser** — The individual, partnership, joint venture, or corporation contracting with the Government under the terms of a Timber Sale Contract and acting independently or through agents, employees, or subcontractors.

**Protected Streamcourse** — A drainage shown on the plans or timber sale area map that requires designated mitigation measures.

**Road Order** — An order affecting and controlling traffic on roads under Forest Service jurisdiction. Road Orders are issued by a designated Forest Officer under the authorities of 36 CFR, part 260.

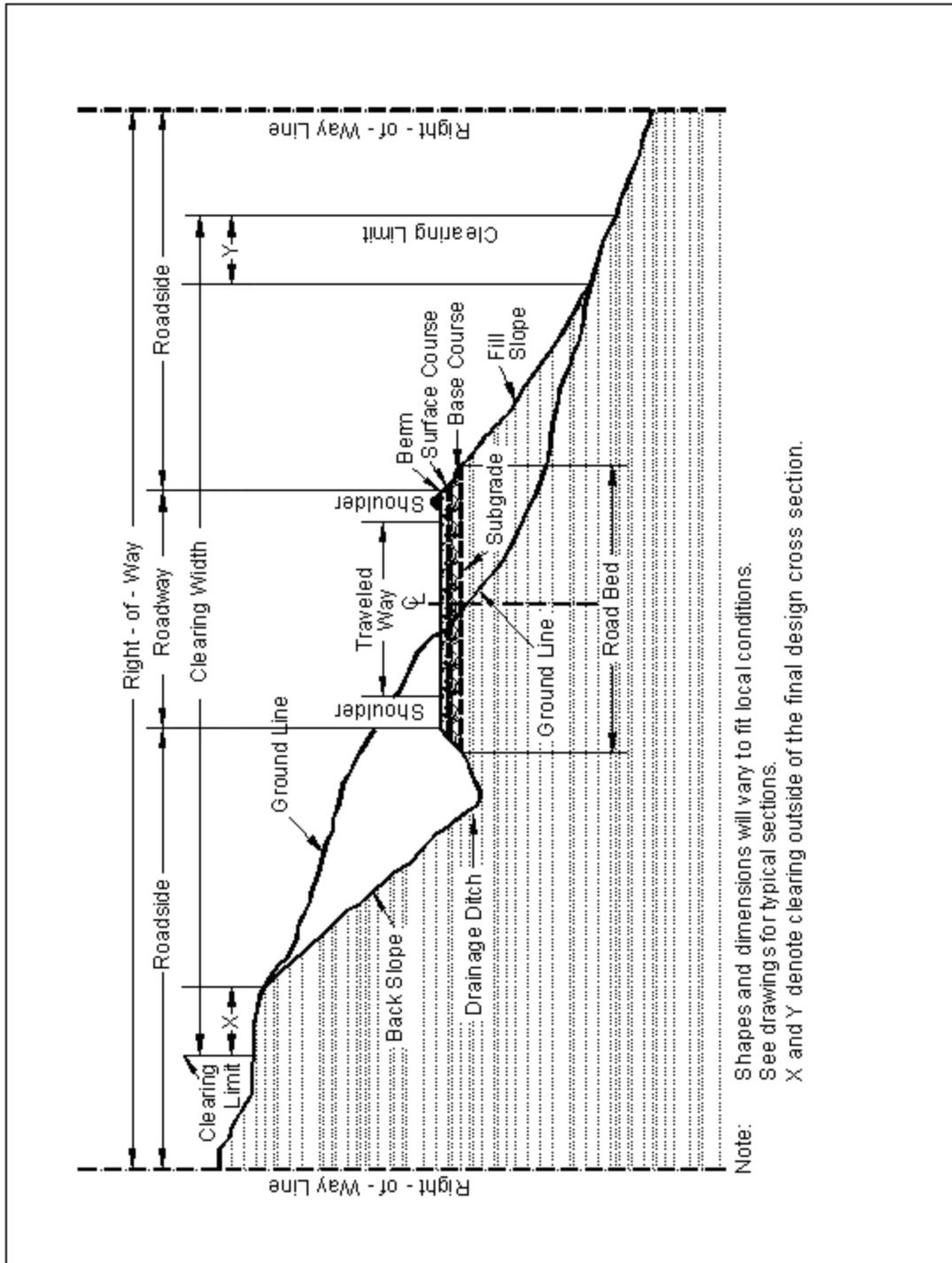
**Shop Drawings** — (Timber and Stewardship Contracts) Referred to as “Drawings” in FP-14, include drawings, diagrams, layouts, schematics, descriptive literature, illustrations, lists or tables, performance and test data, and similar materials furnished by Purchaser to explain in detail specific portions of the work required by the contract.

**Utilization Standards —**

The minimum size and percent soundness of trees described in Public Works contract specifications or Timber Sale and IRTC contract provisions to determine merchantable timber.

***Add Figure 101-1—Illustration of road structure terms:***

Figure 101-1—Illustration of road structure terms.



## 102 - Bid, Award, and Execution of Contract

102.00\_National\_11\_9\_2016

**Delete Section 102 in its entirety.**

Delete Section 102.

## 103 - Scope of Work

103.00\_National\_11\_9\_2016

**Delete all of Section 103 except Subsection 103.01 Intent of Contract.**

Delete Subsections 103.02, 103.03, 103.04, 103.05.

## 104 - Control of Work

104.00\_National\_11\_9\_2016

**Delete Subsections 104.01, 104.02, and 104.04.**

Delete Subsections 104.01, 104.02, 104.04.

104.06\_National\_11\_9\_2016

**Add the following to Subsection 104.06:**

104.06 Use of Roads by Contractor.

The Contractor is authorized to use roads under the jurisdiction of the Forest Service for all activities necessary to complete this contract, subject to the limitations and authorizations designated in the Road Order(s) or described in the contract, when such use will not damage the roads or national forest resources, and when traffic can be accommodated safely.

# 106 - Acceptance of Work

106.01\_National\_7\_18\_2017

## **Delete Subsection 106.01 and replace with the following:**

### 106.01 Conformity with Contract Requirements.

Follow the requirements of FAR Clause 52.246-12 Inspection of Construction.

References to standard test methods of AASHTO, ASTM, GSA, and other recognized standard authorities refer to the methods in effect on the date of solicitation for bids.

Perform all work to the lines, grades, cross-sections, dimensions, and processes or material requirements shown on the plans or specified in the contract.

Incorporate manufactured materials into the work according to the manufacturer's recommendations or to these specifications, whichever is more strict.

Plan dimensions and contract specification values are the values to be strived for and complied with as the design values from which any deviations are allowed. Perform work and provide material that is uniform in character and reasonably close to the prescribed value or within the specified tolerance range. The purpose of a tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons.

When standard manufactured items are specified (such as fence, wire, plates, rolled shapes, pipe conduits, etc., that are identified by gauge, unit mass, section dimensions, etc.), the identification will be considered to be nominal masses or dimensions. Unless specific contract tolerances are noted, established manufacturing tolerances will be accepted.

The Government may inspect, sample, or test all work at any time before final acceptance of the project. When the Government tests work, copies of test reports are furnished to the Contractor upon request. Government tests may or may not be performed at the work site. If Contractor testing and inspection is verified by the Government, the Contractor's results may be used by the Government to evaluate work for acceptance. Do not rely on the availability of Government test results for process control.

Acceptable work conforming to the contract will be paid for at the contract unit bid price. Four methods of determining conformity and accepting work are described in Subsections 106.02 to 106.05 inclusive. The primary method of acceptance is specified in each Section of work. However, work may be rejected at any time it is found by any of the methods not to comply with the contract.

Remove, repair, or replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted. Removing, repairing, or replacing work; providing temporary traffic control; and any other related work to accomplish conformity will be at no cost to the Government.

**(a) Disputing Government test results.** If the accuracy of Government test results is disputed, promptly inform the CO. If the dispute is unresolved after reasonable steps are taken to resolve the dispute, further evaluation may be obtained by written request. Include a narrative describing the dispute and a proposed resolution protocol that addresses the following:

1. Sampling method;
2. Number of samples;
3. Sample transport;

4. Test procedures;
5. Testing laboratories;
6. Reporting;
7. Estimated time and costs; and
8. Validation process.

If the evaluation requires additional sampling or testing be performed, mutually agree with the Government on witnessing procedures and on sampling and testing by a third party laboratory. Use a third party laboratory accredited by the AASHTO accreditation program. Provide proof of the laboratory's accreditation for the test procedures to be used. Do not use the same laboratory that produced the disputed Government test results or that produced the test results used as a basis for the dispute.

The CO will review the proposed resolution protocol and may modify it before final approval and execution.

The Government will use the approved resolution protocol test results to determine the validity of the disputed testing. If the Government test results are validated, the Contractor will be responsible for all costs associated with developing and performing the resolution protocol. If the Government test results are not validated, the Government will be responsible for all costs associated with developing and performing the resolution protocol. If the validity of the Government test results cannot be determined, the Contractor and Government will equally share all costs associated with developing and carrying out the resolution protocol.

**(b) Alternatives to removing and replacing non-conforming work.** As an alternative to removal and replacement, the Contractor may submit a written request to:

1. Have the work accepted at a reduced price; or
2. Be given permission to perform corrective measures to bring the work into conformity.

The request must contain supporting rationale and documentation. Include references or data justifying the proposal based on an evaluation of test results, effect on service life, value of material or work, quality, aesthetics, and other tangible engineering basis. The CO will determine disposition of the nonconforming work.

106.02\_National\_11\_9\_2016

**Delete Subsection 106.02 and replace with the following:**

#### **106.02 Visual Inspection.**

Acceptance is based on visual inspection of the work for compliance with the specific contract requirements. Use prevailing industry standards in the absence of specific contract requirements or tolerances.

## 107 - Legal Relations and Responsibility to the Public

107.05\_National\_7\_18\_2017

**Delete Subsection 107.05.**

Delete Subsection 107.05.

## 108 - Prosecution and Progress

108.00\_National\_11\_9\_2016

**Delete Section 108 in its entirety.**

Delete Section 108.

# 109 - Measurement and Payment

109.00\_National\_11\_9\_2016

**Delete Subsections 109.06, 109.07, 109.08, and 109.09:**

Delete Subsections 109.06, 109.07, 109.08, 109.09.

109.01\_National\_2\_22\_2019

**Delete the third paragraph and Table 109-1 of Subsection 109.01 and replace with the following:**

**109.01 Measurement of Work.**

Take measurements as described in Subsection 109.02 unless otherwise modified by the Measurement Subsection of the section controlling the work being performed. Table 109-1 indicates the accuracy required for quantities of the various pay units used in the Schedule of Items. Use this guide to determine the decimal placement in the final payment.

**Table 109-1**

**Decimal Accuracy of Quantities for Final Payment**

Pay Item	Level of Precision
Linear Foot	1
Exception--Timber, Steel, and concrete Piles	0.1
Station	0.1
Mile	0.01
Square Foot	0.1
Square Yard	0.1
Each	1
Acre	0.01
Gallon	1
M-Gals.	0.1
Cubic Yard	1
Exception--Structure Excavation; Sheathing Materials; Bedding, Bed Course, and Backfill Materials; Gabions;	0.1
Exception--Concrete; Masonry	0.01
Pound	1
Ton	0.1
Exception--Calcium Chloride; Sodium Chloride; Hydrated Lime; Bituminous Materials; Pavements; Bed Course Materials	0.01
Hour	0.1
MFBM	0.01
Station Yard	1
Cubic Yard Mile	1
Ton Mile	1

**Add the following sentence to Subsection 109.02(b):**

109.02 Measurement Terms and Definitions.

**(b) Contract quantity.**

Contract quantities will be adjusted only when there are errors in the original design of 15% or more.

## 155 - Schedules for Construction Contracts

155.00\_National\_11\_9\_2016

**Delete Section 155 in its entirety.**

Delete Section 155.

# 201 - Clearing and Grubbing

201.04\_National\_9\_10\_2018

## Construction Requirements

**Delete paragraph (c) and replace with the following:**

### 201.04 Clearing

(c) In areas outside the excavation, embankment, and slope rounding limits, cut stumps to maximum stump height shown in table below.

Utilization standards for merchantable timber are listed below. Fall and buck merchantable material into lengths not to exceed \_\_\_\_\_ feet. Pieces (logs) meet utilization standards when such pieces would have met Utilization Standards if bucking lengths were varied to include such material.

<b>Minimum Utilization Standards</b>				
<b>Species</b>	<b>Maximum Stump Height (inches)</b>	<b>Length (feet)</b>	<b>Diameter<sup>1</sup> (inches)</b>	<b>% Net Scale<sup>2</sup></b>

<sup>1</sup> measured at inside bark at small end

<sup>2</sup> in % gross scale

201.06\_National\_2\_22\_2018

**Delete the first sentence of Subsection 201.06 and replace the following:**

### 201.06 Disposal.

Merchantable timber is Government property.

# 204 - Excavation and Embankment

204.00\_National\_11\_4\_2016

Delete Section 204 in its entirety and replace with the following.

## Section 204. — EXCAVATION AND EMBANKMENT

### Description

**204.01** This work consists of excavating material and constructing embankments. This work also includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material.

### 204.02 Definitions.

**(a) Excavation.** Excavation consists of the following:

**(1) Roadway excavation.** Material excavated from within the right-of-way or easement areas, except subexcavation covered in Subsection 204.02(a)(2) and structure excavation covered in Sections 208 and 209. Roadway excavation includes all material encountered regardless of its nature or characteristics.

**(2) Subexcavation.** Material excavated from below subgrade elevation in cut sections or from below the original ground-line in embankment sections. Subexcavation excludes the work required by Subsection 204.05 or 204.06.

**(3) Borrow excavation.** Material used for embankment construction that is obtained from outside the roadway prism. Borrow excavation includes unclassified borrow, and topping.

**(b) Embankment construction.** Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:

- (1)** Preparing foundation for embankment;
- (2)** Constructing roadway embankments;
- (3)** Benching for side-hill embankments;
- (4)** Constructing dikes, ramps, mounds, and berms; and
- (5)** Backfilling subexcavated areas, holes, pits, and other depressions.

**(c) Conserved topsoil.** Excavated material conserved from the roadway excavation and embankment foundation areas that is suitable for growth of grass, cover crops, or native vegetation.

**(d) Waste.** Excess and unsuitable roadway excavation and subexcavation that cannot be used.

### Material

**204.03** Conform to the following Subsections:

Topping	704.05
Unclassified borrow	704.06
Water	725.01(c)

## Construction Requirements

**204.04 Preparation for Roadway Excavation and Embankment Construction.** Clear the area of vegetation and obstructions according to Sections 201 and 203.

Road pioneering, slash disposal, and grubbing of stumps may proceed concurrently with excavation and embankment. Maintain drainage during pioneering operations.

**204.05 Conserved Topsoil.** When designated, conserve topsoil from roadway excavation and embankment foundation areas. Stockpile conserved topsoil in low windrows immediately beyond the rounding limits of cut and embankment slopes or in other approved locations. Separate conserved topsoil from other excavated material. When designated, place conserved topsoil on completed slopes according to Section 624.

**204.06 Roadway Excavation.** Excavate as follows:

**(a) Rock cuts.** Blast rock according to Section 205. Excavate rock cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Backfill to subgrade with topping or other suitable material. Compact the material according to Subsection 204.11.

**(b) Earth cuts.** Scarify earth cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Compact the scarified material according to Subsection 204.11.

**(c) Pioneer Roads.** Conduct excavation and placement operations so material to be treated under Section 201 will not be incorporated into the roadway unless specified in the slash treatment method. Maintain drainage during pioneering operations.

Remove snow and ice in advance of the work and deposit beyond the roadway limits in a manner that will not waste material or generate sediment. Do not incorporate snow and ice into embankments. Place snow or ice in a manner to prevent resource damage.

**(d) Drainage Feature.** Drainage feature includes construction of all ditches, minor channel changes, drainage dips, catch basins, surface water deflectors, and other minor drainage structures. Compact the material according to Subsection 204.11. Excavate on a uniform grade between control points.

Do not disturb material and vegetation outside the construction limits. Retrieve material deposited outside the construction limits. Dispose of unsuitable or excess excavation material according to Subsection 204.14. Replace shortage of suitable material caused by premature disposal of roadway excavation.

Shape to drain and compact the work area to a uniform cross-section at the end of each day's operations.

**204.07 Subexcavation.** Excavate material to the required limits. Dispose of unsuitable material according to Subsection 204.14. Take cross-sections according to Section 152. Backfill subexcavated area with suitable material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness and compact according to Subsection 204.11. Prevent unsuitable material from mixing with suitable backfill material.

**204.08 Borrow Excavation.** Use suitable roadway excavation in embankment construction. Do not use borrow excavation when it results in excess roadway excavation. Deduct excess borrow excavation from the total borrow excavation quantity.

Obtain borrow source approval according to Subsection 105.02. Develop and restore borrow sources according to Subsections 105.03 and 105.06. Do not excavate beyond the established limits. When applicable, shape the borrow source to permit accurate measurements when excavation is complete.

**204.09 Preparing Foundation for Embankment Construction.** Prepare foundation for embankment construction as follows:

**(a) Embankment over natural ground.** Remove topsoil and break up the ground surface to a minimum depth of 6 inches (150 millimeters) by plowing or scarifying. Compact the ground surface according to Subsection 204.11.

**(b) Embankments over an existing asphalt, concrete, or gravel road surface.** Scarify gravel roads to a minimum depth of 6 inches (150 millimeters). Scarify or pulverize asphalt and concrete roads to 6 inches (150 millimeters) below the pavement. Reduce particles to a maximum size of 6 inches (150 millimeters) and produce a uniform material. Compact the surface according to Subsection 204.11.

**(c) Embankment across ground not capable of supporting equipment.** Dump successive loads of embankment material in a uniformly distributed layer to construct the lower portion of the embankment. Limit the layer thickness to the minimum depth necessary to support the equipment.

**(d) Embankment on an existing slope steeper than 1V:3H.** Cut horizontal steps in the existing slope to a sufficient width to accommodate placement and compaction operations and equipment. Step the slope as the embankment is placed and compacted in layers. Begin each step at the intersection of the original ground and the vertical cut of the previous step.

**204.10 Embankment Construction.** Incorporate only suitable roadway excavation material into the embankment. When the supply of suitable roadway excavation is exhausted, furnish unclassified borrow to complete the embankment. Obtain written approval before beginning construction of embankments over 6 feet (2 meters) high at subgrade centerline. Construct embankments as follows:

**(a) General.** At the end of each day's operations, shape to drain and compact the embankment surface to a uniform cross-section. Eliminate ruts and low spots that could hold water.

During all stages of construction, route and distribute hauling and leveling equipment over the width and length of each layer of material.

Compact embankment side slopes with a tamping foot roller, by walking with a dozer, or by over-building the fill and then removing excess material to the final slope line. For slopes 1V:1 $\frac{3}{4}$ H or steeper, compact the slopes as embankment construction progresses.

**(b) Embankment within the roadway prism.** Place embankment material in horizontal layers not exceeding 12 inches (300 millimeters) in compacted thickness. Incorporate oversize boulders or rock fragments into the 12-inch (300-millimeter) layers by reducing them in size or placing them individually as required below. Compact each layer according to Subsection 204.11 before placing the next layer.

Material composed predominately of boulders or rock fragments too large for 12-inch (300-millimeter) layers may be placed in layers up to 24 inches (600 millimeters) thick. Incorporate oversize boulders or rock fragments into the 24-inch (600-millimeter) layer by reducing them in size or placing individual rock fragments and boulders greater than 24 inches (600 millimeters) in diameter as follows:

**(1)** Reduce rock to less than 48 inches (1200 millimeters) in the largest dimension;

**(2)** Distribute rock within the embankment to prevent nesting;

**(3)** Place layers of embankment material around each rock to a depth not greater than that permitted above. Fill voids between rocks; and

**(4)** Compact each layer according to Subsection 204.11(a) before placing the next layer.

**(c) Embankment outside of roadway prism.** When placing embankment outside the staked roadway prism, place material in horizontal layers not exceeding 24 inches (600 millimeters) in compacted thickness. Compact each layer according to Subsection 204.11.

**204.11 Compaction.** Compact the embankment using one of the following methods as specified.

**(a) Placement Method 1.** Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

**(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve.** Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width with one of the following and until there is no visible evidence of further consolidation:

*(a)* Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;

*(b)* Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or

*(c)* Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(a), by four passes; or

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 204.11(a)(1)(b) and (c), by eight passes.

**(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve.** Classify the material according to AASHTO M 145. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content. Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width according to Subsection 204.11(a)(1).

**(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve.** Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 99, Method C.

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

**(b) Placement Method 2.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate roller compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

**(1)** Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

**(2)** Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

**(3)** Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

**(4)** Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

**(c) Placement Method 3.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

**(d) Placement Method 4.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer.

**(e) Placement Method 5.** Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by ½ width of bucket.

**(f) Placement Method 6.** Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes.

**204.12 Drainage Features.** Slope, grade, and shape all drainage features. Remove projecting roots, stumps, rock, or similar matter. Maintain all drainage features in an open condition and without sticks, and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place excavated material on the downhill side so the bottom of the ditch is approximately 18 inches (450 millimeters) below the crest of the loose material. Clean the ditch using a hand shovel or other suitable method. Shape to provide drainage without overflow.

**204.13 Sloping, Shaping, and Finishing.** Complete subgrade, slopes, drainage features, culverts, riprap, and other underground minor structures before placing aggregate courses. Slope, shape, and finish to the designated tolerance class as defined in Table 204-2 as follows:

**(a) Sloping.** Leave earth slopes with uniform roughened surfaces, except as described in Subsection 204.13(b), with no noticeable break as viewed from the road. Except in solid rock, round tops and bottoms of slopes including the slopes of drainage ditches. Round material overlaying solid rock to the extent practical. Scale rock slopes. Slope rounding is not required on tolerance class D through M roads.

If a slide or slipout occurs on a cut or embankment slope, remove or replace the material and repair or restore damage to the work. Bench or key the slope to stabilize the slide. Reshape the cut or embankment slope to an acceptable condition.

**(b) Stepped slopes.** Where required, construct steps on slopes of 1½V:1H to 1V:2H. Construct the steps approximately 18 inches (450 millimeters) high. Blend the steps into natural ground at the end of the cut. If the slope contains non-rippable rock outcrops, blend steps into the rock. Remove loose material found in transitional area. Except for removing large rocks that may fall, scaling stepped slopes is not required.

**(c) Shaping.** Shape the subgrade to a smooth surface and to the cross-section required. Shape slopes to gradually transition into slope adjustments without noticeable breaks. At the ends of cuts and at intersections of cuts and embankments, adjust slopes in the horizontal and vertical planes to blend into each other or into the natural ground.

**(d) Finishing.** Ensure that the subgrade is visibly moist during shaping and dressing; smooth and uniform, and shaped to conform to the typical sections. Remove material larger than 6 inches (150 millimeters) from the top 6 inches (150 millimeters) of the roadbed. Remove unsuitable material from the roadbed, and replace it with suitable material. Scarify to 6 inches (150 millimeters) below the bottom of low sections, holes, cracks, or depressions and bring back to grade with suitable material.

Maintain proper ditch drainage.

**204.14 Disposal of Unsuitable or Excess Material.** Dispose of unsuitable or excess material at designated sites or according to Subsection 203.05(a)

When there is a pay item for waste, shape and compact the waste material in its final location. Do not mix clearing or other material not subject to payment with the waste material.

**204.15 Acceptance.** See Table 204-1 for sampling, testing, and acceptance requirements.

Material for embankment and conserved topsoil will be evaluated under Subsections 106.02 and 106.04.

Excavation and embankment construction will be evaluated under Subsections 106.02 and 106.04.

Subexcavation will be evaluated under Subsections 106.02 and 106.04.

## Measurement

**204.16** Measure the Section 204 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

**(a) Roadway excavation.** Measure roadway excavation in its original position as follows:

**(1)** Include the following volumes in roadway excavation:

- (a)* Roadway prism excavation;
- (b)* Rock material excavated and removed from below subgrade in cut sections;
- (c)* Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not listed in the bid schedule;
- (d)* Ditches, except furrow ditches measured under a separate pay item;
- (e)* Conserved topsoil;
- (f)* Borrow material used in the work when a pay item for borrow is not listed in the bid schedule;
- (g)* Loose scattered rocks removed and placed as required within the roadway;
- (h)* Conserved material taken from pre-existing stockpiles and used in Section 204 work, except topsoil measured under 624; and
- (i)* Slide and slipout material not attributable to the Contractor's method of operation.

**(2)** Do not include the following in roadway excavation:

- (a)* Overburden and other spoil material from borrow sources;
- (b)* Overbreakage from the backslope in rock excavation;
- (c)* Water or other liquid material;
- (d)* Material used for purposes other than required;
- (e)* Roadbed material scarified in place and not removed;
- (f)* Material excavated when stepping cut slopes;
- (g)* Material excavated when rounding cut slopes;
- (h)* Preparing foundations for embankment construction;
- (i)* Material excavated when benching for embankments;
- (j)* Slide or slipout material attributable to the Contractor's method of operation;
- (k)* Conserved material taken from stockpiles constructed at the option of the Contractor;
- (l)* Material excavated outside the established slope limits; and
- (m)* Road pioneering for the convenience of the Contractor.

**(3)** When both roadway excavation and embankment construction pay items are listed in the bid schedule, measure roadway excavation only for the following:

(a) Unsuitable material below subgrade in cuts and unsuitable material beneath embankment areas when a pay item for subexcavation is not listed in the bid schedule;

(b) Slide and slipout material not attributable to the Contractor's method of operations; and

(c) Drainage ditches, channel changes, and diversion ditches.

**(b) Unclassified borrow, and topping.** When measuring by the cubic yard (cubic meter) measure in its original position. If borrow excavation is measured by the cubic yard (cubic meter) in-place, take initial cross-sections of the ground surface after stripping overburden. Upon completion of excavation and after the borrow source waste material is returned to the source, retake cross-sections before replacing the overburden. Do not measure borrow excavation until suitable roadway excavation is depleted.

**(c) Embankment construction.** Measure embankment construction in its final position. Do not make deductions from the embankment construction quantity for the volume of minor structures.

**(1)** Include the following volumes in embankment construction:

(a) Roadway embankments;

(b) Material used to backfill subexcavated areas, holes, pits, and other depressions;

(c) Material used to restore obliterated roadbeds to original contours; and

(d) Material used for dikes, ramps, mounds, and berms.

**(2)** Do not include the following in embankment construction:

(a) Preparing foundations for embankment construction;

(b) Adjustments for subsidence or settlement of the embankment or of the foundation on which the embankment is placed; and

(c) Material used to round fill slopes.

**(d) Rounding cut slopes.** If a pay item for slope rounding is included in the bid schedule measure rounding cut slopes horizontally along the centerline of the roadway. If a pay item is not included for slope rounding is not included in the bid schedule payment will be considered indirect to roadway excavation.

**(e) Waste.** Measure waste by the cubic yard (cubic meter) in its final position. Take initial cross-sections of the ground surface after stripping over-burden. Upon completion of the waste placement, retake cross-sections before replacing overburden.

**(f) Slope scaling.** Measure slope scaling by the cubic yard (cubic meter) in the hauling vehicle.

**(g) Subexcavation.** Measure subexcavation by the cubic yard (cubic meter) in its original position.

**(h) Drainage features.** Measurement includes all excavation, embankment, shaping, and grading necessary for a completed drainage feature.

### Payment

**204.17** The accepted quantities will be paid at the contract price per unit of measurement for the Section 204 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

**Table 204-1  
Sampling, Testing, and Acceptance Requirements**

<b>Material or Product (Subsection)</b>	<b>Type of Acceptance (Subsection)</b>	<b>Characteristic</b>	<b>Category</b>	<b>Test Methods Specifications</b>	<b>Sampling Frequency</b>	<b>Point of Sampling</b>	<b>Split Sample</b>	<b>Reporting Time</b>
<b>Source</b>								
Topping (704.05)	Measured and tested for conformance (106.04 & 105)	Classification <sup>(1)</sup>	–	AASHTO M 145	1 per soil type and source of material	Processed material	Yes	Before using in work
Unclassified borrow (704.06)	"	"	–	"	"	"	"	"
<b>Production</b>								
Topping (704.05) and (204.11(a))	Measured and tested for conformance (106.04)	Moisture-density	–	T 99, Method C <sup>(2)</sup>	1 per soil type, but not less than 1 per each 13,000 yd <sup>3</sup> (10,000 m <sup>3</sup> )	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd <sup>2</sup> (3000 m <sup>2</sup> ), but not less than 3 per layer	In-place	No	Before placement of next layer
Unclassified borrow (704.06) and (204.11(a))	"	Moisture-density	–	T 99, Method C <sup>(2)</sup>	1 per soil type, but not less than 1 per each 13,000 yd <sup>3</sup> (10,000 m <sup>3</sup> )	Processed material	Yes	Before using in work
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd <sup>2</sup> (3000 m <sup>2</sup> ), but not less than 3 per layer	In-place	No	Before placement of next layer

**Table 204-1  
Sampling, Testing, and Acceptance Requirements**

<b>Material or Product (Subsection)</b>	<b>Type of Acceptance (Subsection)</b>	<b>Characteristic</b>	<b>Category</b>	<b>Test Methods Specifications</b>	<b>Sampling Frequency</b>	<b>Point of Sampling</b>	<b>Split Sample</b>	<b>Reporting Time</b>
<b>Production (continued)</b>								
Earth embankment (204.11(a))	Measured and tested for conformance (106.04)	Classification	–	AASHTO M 145	1 per soil type	Source of material	Yes	Before using in work
		Moisture-density	–	T 99, Method C <sup>(2)</sup>	1 per soil type, but not less than 1 per each 13,000 yd <sup>3</sup> (10,000 m <sup>3</sup> )	"	"	"
		Density	–	AASHTO T 310 or other approved procedures	1 per 3500 yd <sup>2</sup> (3000 m <sup>2</sup> ), but not less than 3 per layer	In-place	No	Before placement of next layer
Top of subgrade (204.11(a))	"	Density	–	AASHTO T 310 or other approved procedures	1 per 2500 yd <sup>2</sup> (2000 m <sup>2</sup> ), but not less than 3 per layer	In-place	No	Before placement of next layer
<b>Finished Product</b>								
Roadbed (204.13)	Measured and tested for conformance (106.04)	Final line & grade	–	Field measured	Determined by the CO	Determined by the CO	No	Before placement of next layer

(1) Not required when using Government-provided source.

(2) Minimum 5 points per proctor.

**Table 204-2  
Construction Tolerances**

Location Description	Tolerance Class (a)												
	A	B	C	D	E	F	G	H	I	J	K	L	M
Roadbed width (ft)	+0.5	+0.5	+1.0	+1.0	+1.0	+1.0	+1.5	+1.0	+2.0	+2.0	+2.0	+2.0	+2.0
Subgrade elevation (ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±2.0	±3.0	±2.0	±3.0	(c)
Centerline alignment (ft)	±0.2	±0.2	±0.5	±0.5	±1.0	±1.0	±1.5	±1.5	±2.0	±3.0	±3.0	±5.0	(c)
Slopes, excavation, and embankment (% slope <sup>(b)</sup> )	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10	±20	±20	±20

(a) Maximum allowable deviation from construction stakes and drawings.

(b) Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

(c) Unless otherwise shown the centerline alignment and subgrade elevation, as built, have no horizontal curves with a radius of less than 80 feet, and no vertical curves with a curve length of less than 80 feet when the algebraic difference in the grade change is less than 10 percent, or a curve length of less than 100 feet when the algebraic difference of the grade change is greater than or equal to 10 percent. The centerline grade is not to exceed 20 percent in 100 feet of length.

## 209 - Structure Excavation and Backfill

209.09\_National\_7\_18\_2017

Make the following Changes to Subsection 209.09:

209.09 Backfill.

Add the following to Subsection 209.09(a):

**(a) General.**

Backfill without damaging or displacing the culvert or structural plate structure. Replace any pipe that is distorted by more than 5 percent of nominal dimensions, or that is ruptured or broken.

Add the following to Subsection 209.09(b)

**(b) Pipe culverts.**

Do not place or backfill pipe that meets any of the following conditions until the excavation and foundation have been approved in writing by the CO:

- Embankment height greater than 6 feet at subgrade centerline.
- Installation in a protected stream course.
- Round pipe with a diameter of 48 inches or greater.
- Pipe arches with a span of 50 inches or greater.
- Any box culvert or structure other than pipe culverts.

209.10\_National\_7\_17\_2017

Delete Subsection 209.10 and replace with the following:

209.10 Compacting.

Compact the embankment using one of the following methods as specified.

**(a) Compaction Method 1.** Use AASHTO T 27 to determine the quantity of material retained on a No. 4 (4.75-millimeter) sieve. Compact as follows:

**(1) More than 80 percent retained on a No. 4 (4.75-millimeter) sieve.** Adjust the moisture content to a level suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact

each layer of material full width with one of the following and until there is no visible evidence of further consolidation:

- (a) Four roller passes of a vibratory roller having a minimum dynamic force of 40,000 pounds (180 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute;
- (b) Eight roller passes of a 20-ton (20-metric ton) compression-type roller; or
- (c) Eight roller passes of a vibratory roller having a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration and a minimum frequency of 1000 vibrations per minute.

Increase the compactive effort for layers deeper than 12 inches (300 millimeters) as follows:

- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(a), by four passes; or
- For each additional 6 inches (150 millimeters) or fraction thereof, increase the number of roller passes in Subsection 209.10(a)(1)(b) and (c), by eight passes.

**(2) 50 to 80 percent retained on a No. 4 (4.75-millimeter) sieve.** Classify the material according to AASHTO M 145. Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content. Use AASHTO T 99 to determine the optimum moisture content of the portion of the material passing a No. 4 (4.75-millimeter) sieve. Multiply this number by the percentage of material passing a No. 4 (4.75-millimeter) sieve, and add 2 percent to determine the optimum moisture content of the material.

Use nonvibratory rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Compact each layer of material full width according to Subsection 209.10(a)(1).

**(3) Less than 50 percent retained on a No. 4 (4.75-millimeter) sieve.** Classify the material according to AASHTO M 145. For material classified A-1 or A-2-4, determine the maximum density according to AASHTO T 99, Method C..

Adjust the moisture content of material classified A-1 through A-5 to a moisture content suitable for compaction. Adjust the moisture content of material classified A-6 and A-7 to within 2 percent of the optimum moisture content.

Use compression-type or vibratory rollers. Compact each layer of material full width to at least 95 percent of the maximum density. Determine the in-place density and moisture content according to AASHTO T 310 or other approved test procedures. When required, use AASHTO T 224 to correct for coarse particles.

**(b) Compaction Method 2.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate roller compaction equipment over the full width of each layer until there is no visible evidence of further consolidation or, if when a sheepsfoot roller is used, the roller “walks out” of the layer. Make at least three complete passes. Use compression-type rollers at speeds less than 6 feet (1.8 meters) per second and vibratory rollers at speeds less than 3 feet (1 meter) per second. Ensure rollers meet the following requirements:

(1) Steel wheeled rollers, other than vibratory, capable of exerting a force of not less than 250 pounds per inch (4.5 kilogram/millimeter) of width of the compression roll or rolls.

(2) Vibratory steel wheeled rollers equipped with amplitude and frequency controls with a minimum dynamic force of 30,000 pounds (130 kilonewtons) impact per vibration, specifically designed to compact the material on which it is used.

(3) Pneumatic-tired rollers with smooth tread tires of equal size that will provide a uniform compacting pressure for the full width of the roller and capable of exerting a ground pressure of at least 80 psi (550 Kilopascals).

(4) Sheepsfoot, tamping, or grid rollers capable of exerting a force of 250 pounds per inch (4.5 kilogram/millimeter) of width of roller drum.

**(c) Compaction Method 3.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer until there is no visible evidence of further consolidation. Make at least three complete passes.

**(d) Compaction Method 4.** Adjust the moisture content of the material to a moisture content suitable for compaction. Fill the interstices around rock with earth or other fine material as practical. Operate hauling and spreading equipment uniformly over the full width of each layer.

**(e) Compaction Method 5.** Adjust the moisture content of the material to a moisture content suitable for compaction. Compact the complete surface with a bucket of an excavator larger than 39,000 pounds (18 metric ton) Gross Vehicle Weight using a minimum of three blows. Overlap compaction by  $\frac{1}{2}$  width of bucket.

**(f) Compaction Method 6.** Adjust the moisture content of the material to a moisture content suitable for compaction. Compact using an approved mechanical tamper for a minimum of three complete passes.

When compacting with rollers or hauling and spreading equipment is not practical, use approved mechanical tampers for a minimum of three complete passes.

## 301 - Untreated Aggregate Courses

301.03\_National\_7\_17\_2017

Add the following to Subsection 301.03:

### 301.03 General.

Written approval of the roadbed is required before placing aggregate.

For pit run or grid-rolled material, furnish material smaller than the maximum size, no gradation will be required otherwise. After processing on the road, remove all oversize material from the road and dispose as directed by the CO.

Provide additives or binder, if required, at the proportions specified.

Develop and use Government furnished sources according to Section 105.

If the aggregate is produced and stockpiled before placement, handle and stockpile according to Section 314.

301.05\_National\_7\_17\_2017

Delete Subsection 301.05 and replace with the following:

### 301.05 Compacting.

Compact each layer full width. Roll from the sides to the center, parallel to the centerline of the road. Along curbs, headers, walls, and all places not accessible to the roller, compact the material with approved tampers or compactors.

Compact the aggregate using one of the following methods as specified:

- (a) **Compaction A.** Operating spreading and hauling equipment over the full width of the travelway.
- (b) **Compaction B.** Operate rollers and compact as specified in Subsection 204.11(a)(1).
- (c) **Compaction C.** Moisten or dry the aggregate to a uniform moisture content between 5 and 7 percent based on total dry weight of the mixture. Operate rollers and compact as specified in Subsection 204.11(a)(1).
- (d) **Compaction D.** Compact to a density of at least 95 percent of the maximum density, as determined by AASHTO T 99, method C or D.
- (e) **Compaction E.** Compact to a density of at least 95 per-cent of the maximum density, as determined by AASHTO T 180, method C or D.

For all compaction methods, blade the surface of each layer during the compaction operations to remove irregularities and produce a smooth, even surface. When a density requirement is specified, determine the in place density and moisture content according to AASHTO T 310 or other approved test procedures.

## 302 - Minor Crushed Aggregate

302.04\_National\_7\_18\_2017

*Add the following to Subsection 302.04 and 302.04(a)*

### 302.04 Placing Crushed Aggregate.

Written approval of the surface is required before placing aggregate.

**(a) Roadway aggregate.**

For pit run or grid-rolled material, furnish material smaller than the maximum size, no gradation will be required otherwise. After processing on the road, remove all oversize material from the road and dispose as directed by the CO.

## 303 - Road Reconditioning

303.07\_National\_7\_18\_2017

Add the following to Subsection 303.07:

### 303.07 Roadway Reconditioning.

Remove cattleguard decks. Clean the deck and the area beneath the cattleguard of soil and other material to the bottom of the original foundation over the entire width of the installation. Dispose of waste at designated sites or according to Subsection 204.14. Reinstall the cattleguard deck.

## 633 - Permanent Traffic Control

633.00\_National\_11\_8\_2016

Delete the first sentence of Subsection 633.02 and replace with the following:

### 633.02 Material.

Conform to the MUTCD, USDA Forest Service EM-7100-15, and the following Section and Subsections:

Make the following changes to Subsection 633.03:

### 633.03 General.

Delete the first paragraph of Subsection 633.03 and replace with the following:

Furnish and install permanent traffic control devices according to the MUTCD, USDA Forest Service EM-7100-15 and permanent traffic control plans. Provide traffic control devices that are crashworthy.

Add the following sentence to Subsection 633.03:

Sign panel layout proofs shall be approved by the CO prior to ordering.

Add the following to Subsection 633.05(a):

### 633.05 (a) Fabrication.

**(3) Protective Overlay Film.** When specified, cover the entire face of a sign with a clear high-performance, solvent-resistant, ultraviolet-stabilized, pressure-sensitive adhesive, protective overlay film. Use 3M Scotchlite Premium Protective Overlay Film Series 1160 or approved equivalent.

**(4) Edge Film.** When specified, edge film shall be 3 inches wide vinyl film that is pressure-sensitive, premium quality, clear, and ultraviolet-resistant.

## 701 - Cement

701.02\_National\_7\_10\_2017

Add the following to Subsection 701.02:

### 701.02 Masonry and Mortar Cement.

Keep mortar in the original manufacturer's labeled containers until used. Protect as specified for Portland cement in 701.01. Do not use mortar after the expiration date shown on the container or 1 year from date of purchase, whichever date occurs first.

Store, mix, place and cure in accordance with the manufacturer's instructions; submit a copy in advance of use to the CO.

Furnish mortar that is a chemical action concrete of the magnesium ammonium phosphate family and requires no curing under ambient temperatures of 36° - 100° F. Require recommendation by its manufacturer specifically for use in prestressed concrete bridge member keyways that are to be part of the finished wearing and running surface of the bridge, subjected to normal roadway contaminants and conditions promoting wear of normal bridge deck concrete.

Typical properties of the mortar, when tested neat without aggregate, are as follows, except when noted:

- Compressive strength (ASTM C 109 modified) of 6000 psi at 24 hours at 72° F or above, and when used below 50° F, 5000 psi.
- Modulus of elasticity (ASTM C 469) at 7 and 28 days of 4177 ksi and 4554 ksi.
- Freeze-thaw durability (ASTM C 666, Procedure A Modified) of a relative dynamic modulus greater than 80 percent after 300 cycles.
- Scaling resistance to deicing chemicals (ASTM C 672) after 5 and 25 cycles at a rating of 0, shall show no surface scaling; after 50 cycles at a rating of 1.5 shall show only slight surface scaling.
- Sulfate resistance (ASTM C 1012) length change after 52 weeks shall be no greater than 0.9 percent.
- Coefficient of thermal expansion (CRD-C 39-81) when run with 1 inch x 1 inch x 11 inch bars and neat mixes without aggregate, shall be within 10 percent of 7150 psi/degree Fahrenheit.
- Flexural strength (ASTM C 78 Modified) of 3 inch x 4 inch x 16 inch prisms shall be 3.8 550 psi at 24 hours for the mortar only, and 670 psi with 3/8 inch pea gravel.

Submit independent tests for the mortar recommended for use from 50° - 100° F, when used to fill test specimens conforming to the Government's bridge box beam test keyway, showing the following results:

Lateral (horizontal) shear between adjacent members: Range of 14 k/ft of keyway

Vertical shear between adjacent members: 16 k/ft of keyway

Direct tension between adjacent members: 6 k/ft of keyway.

Submit independent tests for the mortar recommended for use from 36° - 50° F, when used to fill test specimens conforming to the Government's bridge box beam test keyway, showing the following results:

- Lateral (horizontal) shear between adjacent members: Range of 2.4 k/ft of keyway
- Vertical shear between adjacent members: 6 k/ft of keyway
- Direct tension between adjacent members: 4 k/ft of keyway.

Two products that meet these requirements are BASF/Master Builders Technologies Regular Set-45 [for use below 50° F] and Set-45 Hot Weather Formula [for use from 50° - 100° F].

Use Set-45 Hot Weather Formula in air temperatures from 50° - 100° F. Use Regular Set-45 only in air temperatures below 50° F. When used in temperatures below 36° F, use approved weather precautions designed to prevent the mortar from freezing. Except when used in bridge deck keyways and blockouts, Regular Set-45 may be extended by the addition of 20 pounds of washed and clean 3/8 inch minus pea gravel per 50 pound bag when placed in thicknesses over 1.5 inches, or when approved by the CO.

Unless using one of the two products described above, submit products proposed for use to the CO for approval, and accompany them with the manufacturer's submittals substantiating all requirements in this section, including (1) graphs or charts showing the time, temperature, humidity, and curing requirements to achieve mortar strengths equal to the adjacent concrete; and (2) complete recommendations for storage, mixing, application and curing procedures.

# 703 - Aggregate

703.05\_National\_1\_23\_2020

**Delete 703.05 and replace with the following:**

**703.05 Subbase, Base, Surface Course, and Screened Aggregate.**

**(a) Subbase or base aggregate.** Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-2
(2) Liquid limit, AASHTO T 89	25 max.
(3) Plastic limit, AASHTO T 90	Nonplastic
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	50% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

**(b) Surface course aggregate.** Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming the following:

(1) Gradation	Table 703-3
(2) Liquid limit, AASHTO T 89	35 max.
(3) Plastic Index, AASHTO T 90	
a) If the percent passing the No. 200 sieve is less than 12%	2 to 9
b) If the percent passing the No. 200 sieve is greater than 12%	Less than 2
(4) Los Angeles abrasion, AASHTO T 96	40% max.
(5) Sodium sulfate soundness loss (5 cycles), AASHTO T 104	12% max.
(6) Durability index (coarse), AASHTO T 210	35 min.
(7) Durability index (fine), AASHTO T 210	35 min.
(8) Fractured faces, ASTM D 5821	75% min.
(9) Free from organic matter and lumps or balls of clay	

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Do not furnish material that contains asbestos fibers.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the No. 4 sieve, shall consist of natural or crushed sand and fine mineral particles.

**(c) Screened aggregate** – Furnish hard, durable particles or fragments of stone, slag, or gravel conforming the following:

- |   |              |
|---|--------------|
| <b>(1)</b> Gradation  | Table 703-16 |
| <b>(2)</b> Plastic Index, AASHTO T 90                           | Less than 9  |
| <b>(3)</b> Los Angeles abrasion, AASHTO T 96                    | 55% max.     |
| <b>(4)</b> Free from organic matter and lumps or balls of clay. |              |

Do not use material that breaks up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

Delete Table 703-2 and replace with the following:

**Table 703-2  
Target Value Ranges for Subbase and Base Gradation  
Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)**

Sieve Size	Grading Designation				
	A (Subbase)	B (Subbase)	C (Base)	D (Base)	E (Base)
2½ inch	100				
2 inch	97 – 100	100	100		
1½ inch		97 – 100			
1 inch	65 – 79 (6)		80 – 100 (6)	100	
¾ inch			64 – 94 (6)	86 – 100 (6)	100
½ inch	45 – 59 (7)				
⅜ inch			40 – 69 (6)	51 – 82 (6)	62 – 90 (6)
No. 4	28 – 42 (6)	40 – 60 (8)	31 – 54 (6)	36 – 64 (6)	36 – 74 (6)
No. 40	9 – 17 (4)			12 – 26 (4)	12 – 26 (4)
No. 200	4.0 – 8.0 (3)	4.0 – 12.0 (4)	4.0 – 7.0 (3)	4.0 – 7.0 (3)	4.0 – 7.0 (3)

( ) The value in the parentheses is the allowable deviation (±) from the target values..

**Delete Table 703-3 and replace with the following:**

**Table 703-3  
Target Value Ranges for Surface Gradation**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)							
	Grading Designation							
	F	G	H	S	T	U		
1 1/2 inch	100			100				
1 inch	97-100	100		72 – 92 (6)	100			
3/4 inch	76-89 (6)	97 - 100	97 - 100			100		
1/2 inch					71 – 91 (6)			
3/8 inch	56-68 (6)	70 – 80 (6)	80 – 92 (6)	51 – 71 (6)		71 – 90 (6)		
No. 4	43-53 (7)	51 – 63 (7)	58 – 70 (7)	36 – 53 (7)	43 – 60 (7)	50 – 68 (7)		
No. 8				26 – 40 (6)	30 – 46 (6)	34 – 51 (6)		
No. 16	23-32 (6)	28 – 39 (6)	28 – 40 (6)					
No. 40	15-23 (5)	19 – 27 (5)	16 – 26 (5)	14 – 25 (5)	16 – 28 (5)	19 – 30 (5)		
No. 200	10.0-16.0 (4)	10.0 – 16.0 (4)	9.0 – 14.0 (4)	8.0 – 15.0 (4)	8.0 – 15.0 (4)	8.0 – 15.0 (4)		

( ) The value in the parentheses is the allowable deviation ( $\pm$ ) from the target values.  
If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

**Add Table 703-13:**

**Table 703-13  
Gradation Requirements for Screened Aggregate**

Sieve Size	Percent by Mass Passing Designated Sieve (AASHTO T 27 and T 11)						
	Grading Designation						
	L	M	N	O	P	Q	R
6 inch	100	100					
4 inch			100	100			
3 inch					100	100	
2 inch							100
No. 4		15-45		15-45		15-45	

## 704 - Soil

704.02\_National\_7\_18\_2017

Delete Subsection 704.02(a) and replace with the following:

### 704.02 Bedding Material.

- |                           |   |
|---------------------------|---|
| (a) Maximum particle size | 3 in (75 millimeters) or half the corrugation depth, whichever is smaller |
|---------------------------|---|

## 705 - Rock

705.02\_National\_7\_18\_2017

Add the following Class to Table 705-1 in Subsection 705.02:

705.02 Riprap. Table 705-1.

**Table 705-1  
Gradation Requirements for Riprap(1)**

<b>Class</b>	<b>% of Rock Equal or Smaller by Count, DX</b>	<b>Range of Intermediate Dimensions,(2) inches (millimeters)</b>	<b>Range of Rock Mass,(3) pounds (kilograms)</b>
0	100	6 – 8 (150 – 200)	17 – 41 (8 – 19)
	85	5 – 6 (150 – 150)	10 – 17 (5 – 8)
	50	2 – 5 (50 – 125)	0.6 – 10 (0.3 – 5)
	15	0 – 2 (0 – 50)	0 – 0.6 (0 – 0.3)

## Native Seeding

### 1. MATERIALS AND APPLICATION RATES

- A. Fertilizer rate shall not exceed 400 lbs per acre 10-10-10
- B. Lime to 1000 lbs per acre (May be less, desired soil pH is between 5.5 and 6)
- C. To prepare, apply fertilizer and lime, rake to form a crumbly seed bed, apply seed with a drill seeder, hydroseeder, or broadcast spreader, then roll or cultipac to firm the seed bed and lightly cover seed with soil (1/4 inch to 1/2 inch soil optimal). Apply PAM-12 at a rate of 400 lbs/acre to increase soil/seed contact and to stabilize soil. Lightly mulch.
- D. The following weed-free seed mixtures shall be used:

### E. From Sept.1 to April 1 is the optimal window for seeding native species:

#### 1). *Nurse Crops*

- Wheat/Oats/Grain Rye 80 lb/acre
- Crimson Clover 10 lb /acre

#### 2). *Native Perennial Grasses* – Seed source SC, NC, or GA Preferred; KY (Sumter only), FI (FM only)

- Big Bluestem 2 lb/acre
- Indiangrass 3 lb/acre
- Little Bluestem 5 lb/acre

#### 3). *Native Forbs/Legumes* – Seed source SC, NC, or GA Preferred, KY (Sumter only), FI (FM only)

- Blackeyed Susan 1.0 lb/acre
- False Sunflower 1.0 lb/acre
- Lance Leaved Tickseed (*Coreopsis*) 1.0 lb /acre
- Partridge Pea 1.0 lb/acre
- Roundheaded Lespedeza 0.5 lb/acre
- Spiked Blazing Star 0.5 lb /acre

### If seeding from April 2 to August 31:

#### 1). *Nurse Crop*

- Brown Top Millet 30 lb/acre

#### 2). and 3). *Native Perennial Grasses/Forbs/Legumes* – Same as above

- F. Apply **weed-free** hay, straw, or wood cellulose fiber mulch immediately after seeding at a rate of 1000 lbs/acre.

### 2. SOURCES OF NATIVE ECOTYPE SEED

- Roundstone Native Seed 1-888-531-2352 or 1-270-531-3032, roundstoneseed.com
- Ernst Conservation Seeds 1-800-873-3321 or 1-814-336-2404, ernstseed.com
- National Wild Turkey Federation, Conservation Seed Program, outdoordealhound.com/c-179-warm-season-grasses-forbs, Southeast Coastal Plains or Southeast Upland Mix, respectively, 1-800-THE-NWTF
- Mellow Marsh Farm 1-919-742-1200, mellowmashfarm.com